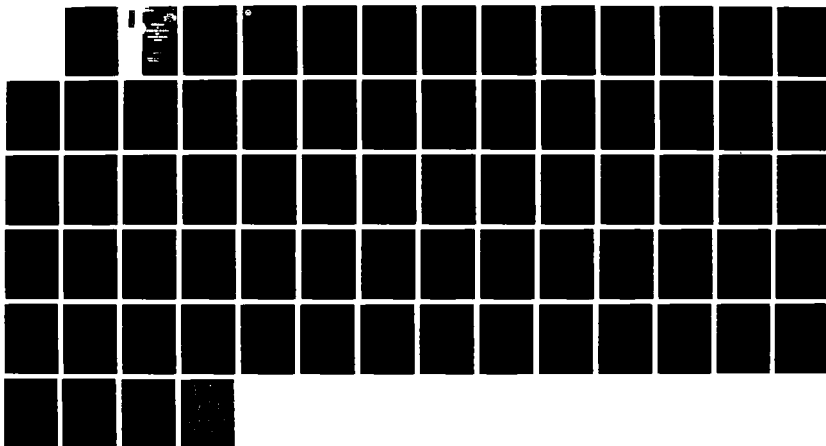
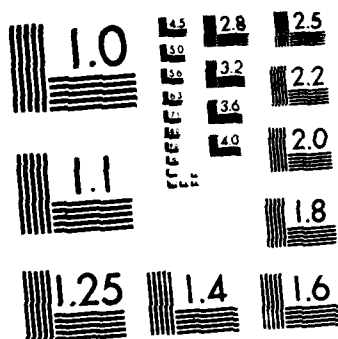


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September 1987

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DEFENSE LOGISTICS AGENCY
HEADQUARTERS
CAMERON STATION
ALEXANDRIA, VIRGINIA 22304-6100

DLA-LO

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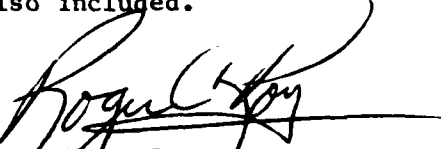
FOREWORD

This updated Compendium of Operations Research and Economic Analysis Studies consists of abstracts of published studies completed by the Operations Research and Economic Analysis (OR/EA) Office of the Defense Logistics Agency. The findings obtained in these studies present objective results reached by the individual analysts, and do not necessarily reflect implementation decisions reached by management.

This Compendium is intended to serve as a reference document for others contemplating similar or related studies. The abstracts reflect the range of capabilities available in the OR/EA Office. The Compendium includes only accessible studies, not all studies performed by the OR/EA Office. Copies of the study reports, which explain the approach taken as well as the results, are available from the OR/EA Office, (202) 274-7227, AUTOVON 284-7227.

Reference to Defense Supply Agency (DSA) should be read as Defense Logistics Agency (DLA). This is a result of the redesignation of DSA to DLA in January 1977.

The Compendium is organized chronologically, with the most recent studies presented first. A subject index is also included.


ROGER C. ROY
Assistant Director,
Policy and Plans

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ABSTRACTS

87-26. Analysis of the Cost of Late Contractor Delivery (September 1987)

This study examined the costs of late vendor delivery for items managed at the Defense General Supply Center (DGSC). The study addresses the direct costs of late delivery which includes the labor and material expended in the attempt to resolve the situation, and the indirect costs which include the maintenance of increased safety levels of material because of increased lead times. The cost of a typical late delivery to DGSC has been quantified by this analysis to be approximately \$11 in labor and materials used to expedite delivery, and \$314 in increased safety levels and maintenance costs. These costs of late delivery represent approximately six percent of the typical replenishment contract cost. The report suggests two possible applications of these cost factors - one during the bid evaluation process and the other to assess liquidated damages. (DLA-LO Project No. 7003)

87-25. Asset Search Pattern for DRMS MILSTRIP Requisitioning System (July 1987)

The objective of this project was to determine the transportation cost savings that could be achieved by changing the search algorithm presently used in the Defense Reutilization and Marketing Service (DRMS) mechanized MILSTRIP requisitioning system. The current system chooses the best assets to fill a requisition, whereas the proposed system selects the closest acceptable assets. Transportation costs were calculated for each routine by using actual requisitions from the first four months of the system's use. A transportation cost savings of approximately two percent would have been achieved for the requisitions used in the analysis with the proposed search algorithm. The quality of the assets being shipped would decrease only slightly with the proposed routine. The study recommends that this new routine be implemented if the expected cost savings is great enough to offset the cost of recoding the computer program. (DLA-LO Project No. 7006)

87-24. Provisioning Policy Study (July 1987)

This project examined a number of alternative policies for buying and supporting provisioning items. Actual (historical) data was used in conjunction with a model of the inventory and provisioning systems. A statistical comparison of outcome measures, such as the total dollar of commitments and the number of backorders generated, was used to assess the alternative provisioning policies. The results of the study identified several policies which significantly reduced the dollar value of inventory, and others which significantly reduced the number of backorders. In general, the provisioning policies evaluated demonstrated an inverse relationship between commitments and assets on the one hand and backorders on the other hand. Two particular policies were identified which slightly increased the dollar value of commitments and assets, but significantly reduced the number and dollar value of backorders. (DLA-LO Project No. 5017)

87-23. Cost of Quality - Source Inspections (July 1987)

The purpose of this study was to estimate the additional cost to the government resulting from the use of mandatory source inspections in lieu of destination inspections for contractors who have a history of submitting quality deficient material. This report provides this estimate and documents the analytical process used. For the contracts of interest to this study, it is estimated that an average, 5.7 hours of source inspection time and 1.1 hours of contract administration time would be required. If the contract has been inspected at the source, approximately .2 hours of depot inspection are avoided. The average net cost to the government is approximately \$150 per contract. Factors which can influence the average cost in order of decreasing importance are commodity (FSC), dollar value of the contract, and DCAS Region. (DLA-LO Project No. 7027)

87-22. Binnable Stockage Locations (June 1987)

This study involved the development of a model to evaluate alternative stockage policies for binnable items. The purpose was to determine if transportation cost savings could be realized by stocking binnable items at fewer DLA depots. The analysis looked at six single depot stockage alternatives and fifteen dual depot alternatives. These stockage location alternatives were compared to the actual system based on the respective costs associated with receiving and shipping these items as well as the incurred transportation costs. The major factor in the total cost model was found to be the depot operating cost. The effects of consolidating the receipts and shipments at one or two depots appear to provide substantial cost savings over the current system, ranging from \$9.7 million to \$13 million per year. (DLA-LO Project No. 6033)

87-21. Impact of Competition on Contract Delinquencies (June 1987)

The purpose of this study was to analyze the impact of recent legislative policy changes in the procurement process on DLA's contract delinquencies. This report documents and summarizes the efforts and conclusions reached in the resultant study. The overall results of the delinquency statistics indicate that competition does not appear to be driver of delinquency. Competitive large purchases generally had a higher delinquency rate and a longer delinquency duration than sole source large purchases. However, items which were broken out from sole source to competition had mixed results for delinquency rates and shorter delinquency duration after a breakout. This mixed pattern of behavior can be partially explained by the fact that competitive contracts had more restrictive delivery schedules than sole source contracts. Findings also showed a downward trend in the average delinquency duration for both large and small purchases since 1984. (DLA-LO Project No. 6030)

87-20. DLA Enhanced Distribution System Follow-up Analysis (May 1987)

The objective of this study was to locate the best sites for potential consolidation points under the Enhanced DLA Distribution System concept and to determine the best number of points to ensure adequate coverage at the highest possible dollar savings. A site selection algorithm was developed using a

heuristic approach known to produce near optimal solutions. Use of the heuristic method enabled us to use a finite-set approach which selected the best sites from a set of pre-selected possibilities. Site selection was based on minimizing the transportation distance, weighted by demand quantities, from the vendor origins to the potential sites. Three scenarios were tested: (1) the best site scenario based on the unrestricted configuration of the site selection model; (2) a modified site scenario constructed manually by using the results of the best site scenario and checking the sensitivity of moving the Philadelphia, PA, site to Mechanicsburg, PA, and the Birmingham, AL, site to Memphis, TN, and (3) a depot site scenario locking the six DLA depot sites into the solution. Results indicated that the best solution was scenario (1) with an annual savings of \$14.6 million. Scenario (3) generated the lowest return at \$13.8 million.

87-19. DLA Warehousing and Storage Automated System (DWASP) Economic Analysis (May 1987)

This report documents an economic analysis of DWASP. The objective was to quantify and compare life cycle DWASP costs and benefits. The analysis time horizon was 11 years (FY 1988-98). Since the decision has already been made to implement certain DWASP increments, this analysis focused on DWASP Increments II through V. The analysis provides total (undiscounted) life cycle costs for the remainder of DWASP, total (undiscounted) life cycle benefits, and total present value (discounted) life cycle costs and benefits. In addition, a savings to investment ratio and a discounted payback period are determined. The economic justification for DWASP is insensitive to major cost escalations and benefit reductions. (DLA-LO Project 6028)

87-18. Variable Safety Level Analysis for C and T (May 1987)

This analysis examined four alternative methods to compute safety levels for the Clothing and Textile (C&T) commodity. The study analyzed the effect on costs and system performance of changing from a fixed to a variable safety level computation for all C&T items. Based on the analysis, immediate use of a variable safety level for all C&T items was recommended in that it would significantly reduce safety level dollar while maintaining virtually no deterioration in supply availability. (DLA-LO Project No. 7011)

87-17. Economic Analysis Support for Automated Information System Control Board (AISC) Working Group, Part II, Procedural Guidelines for Performing AIS EAs (May 1987)

These procedural guidelines were developed to provide a standard approach to performing economic analyses for Automated Information Systems (AISs). The purpose was to assist the AISC in the Integrated Priority List decision process. The procedural guidelines provide guidance in the performance of an economic analysis for a proposed modification to an existing AIS, or for the development of a new AIS. Also, the guidance contains procedures for both preliminary type economic analyses and more detailed analyses. It defines elements of project life criteria, cost requirements, discounting costs, life-cycle costing, sensitivity analysis, and identifying benefits. (DLA-LO Project No. 6024)

87-16. Analysis of DLA's GFM/CFM Policy for the Clothing and Textile Commodity (May 1987)

This analysis contributed to an overall review of DLA's Government Furnished Material (GFM)/Contractor Furnished Material (CFM) policy for the Clothing and Textile commodity by evaluating the impacts on prices and leadtimes from the use of GFM. Several thousand buys where the same approximately 700 items were procured both with and without GFM were examined in this analysis. The expectation that the use of GFM would always result in a lower overall cost to the Government was disapproved by this analysis as in more than half the buys, the cost was actually greater using GFM than CFM. GFM buys tended to have longer administrative leadtimes, but had much shorter production leadtimes resulting in shorter overall leadtimes as would be expected. The overall conclusion was that from the standpoint of prices and leadtimes, the use of GFM should be determined on a contract-by-contract basis.

87-15. Secure Telephone Requirements Analysis (April 1987)

This study consisted of the collection, compilation, and analysis of STU-III telephone requirements. The use of STU-III telephones had been previously proposed in order to protect against the interception of sensitive but unclassified information through nonsecure telephone conversations. The survey provided information on the volume of telephone calls currently made on unsecure telephones involving identified sensitive or vulnerable topics. STU-III requirements were estimated based on degrees of coverage and numbers of calls by directorate, by subject area. A range of options were provided based on the number of sensitive calls per phone per day and the percent of sensitive calls covered. (DLA-LO Project No. 7025)

87-14. DISMS Workload Capacity Study (April 1987)

The DLA Integrated Subsistence Management System (DISMS) provides on-line computer support to Defense Personnel Support Center (DPSC) subsistence management activities. Phase IV, now in design, will provide on-line support to contractor bid evaluation. The purpose of this study was to assess the transaction workload associated with this increment in order to determine appropriate computer sizing. Specifically, the study identified the types and frequencies of online transactions expected with implementation of DISMS Increment IV. Transaction data developed during this study provide a reasonable estimate of the workload resulting from Increment IV. This data indicates that the workload may exceed that presently posed by Increments I-III, combined. The Defense Systems Automation Center (DSAC) will use this data to determine the appropriate computer size to address the workload. (DLA-LO Project No. 6039)

87-13. Motor Carrier Cost Per Mile Analysis (April 1987)

This report documents an analysis of the cost per mile for motor carriers. The analysis examined the cost per hundred weight per mile for shipments originating at DLA depots and destined to points in the Continental United States. Data were obtained from the Freight Information System file for FY 85. Comparisons were made of the mean cost per hundred weight per

mile with mileage groups and weight brackets taken into consideration across all DLA depots. These comparisons determined the relative ranking of each depot, the effects of minimum charges associated with the Guaranteed Traffic Program, and the relative effectiveness of various Guaranteed Traffic Programs for the depots. (DLA-LO Project No. 7024)

87-12. Enhanced DLA Distribution System (EDDS) Analysis (April 1987)

The objective of this analysis was to determine the cost savings generated by the use of each alternative city under consideration for the EDDS and to determine the optimal combination of locations. The DLA EDDS concept involves the collection of small vendor shipments destined to DLA depots at a designated point within CONUS for consolidation and shipment, in truckload lots, to the consignee depots. The study looked at the EDDS concept using a computer model which emulated the flow of vendor traffic from vendor locations to receiving depots. Annual savings of approximately \$14 million were identified under the EDDS concept. Several recommendations were made for additional study. (DLA-LO Project No. 7002)

87-11. IMC Equipment Design (April 1987)

The objective of this project was to develop a simulation model of the materials handling enhancements to the Integrated Material Complex (IMC) design developed for Defense Depot Mechanicsburg, PA. In the receiving area, in-check, inspection, 3P&M, and stow module load processes are modeled. In the packing/consolidation area, packing induction, shipping unit consolidation, packing, shipping and shipping sortation processes are modeled. All associated hardware such as rotary racks, robots, conveyor belts, etc. are modeled as well. Simulation results indicate that the IMC design for receiving and packing is feasible from a system hardware standpoint but may require some fine tuning in the area of system operating procedures. Potential problems and bottlenecks stem more from inefficient material flow than inadequate work station or hardware capacity. Specific recommendations include an alternative strategy for matching material release orders, addition of capacity in the receiving in-check area, addition of capacity or reevaluation of time standards in the receiving inspection areas, and methods to keep receiving induction supplied with empty totes. (DLA-LO Project No. 6018)

87-10. Position Management Application Programs (PMAP) User's Instructions (February 1987)

This user's manual describes and provides instructions for using the PMAP microcomputer program. PMAP uses Automated Pay, Cost, and Personnel System (APCAPS) data and provides management information on the structure and manning of DLA offices at all levels of interest. The system also allows for analysis of proposed changes to the structure in order to provide decision support to the manager. (DLA-LO Project No. 6014)

87-09. NMCSs Cost Analysis (December 1986)

The primary objective of this study was to determine the cost difference between using United Parcel Service (UPS) international air service and the United States Postal Service (USPS) for Non Mission Capable Supply (NMCS)

shipments between 1-70 pounds. This objective was generated due to frequent customer complaints regarding the timeliness and lack of traceability of overseas postal (air mail) NMCS shipments sent by USPS. Secondary objectives were to determine the total number of NMCS shipments from all DLA depots and the number of NMCS shipments shipped through New Cumberland Army Depot, PA, and Sharp Army Depot, CA. The study approach consisted of selecting appropriate shipping records from the Mechanization of Warehousing and Shipment Processing Material Release Order History file for a one year period, 1 Jul 85 through 30 Jun 86, and then determining the cost of these shipments under both methods. The use of UPS international air services which provides two to three day service to most European cities and traceability would cost approximately \$400,000 per year, while the current USPS cost is approximately \$265,000. The UPS approach would cost an additional \$135,000.

87-08. Direct Commissary Support System (DICOMSS) Design Simulation
(December 1986)

The objective of this project was to develop a computer simulation model that would be used to validate the automated system design being proposed for the Defense Depot Mechanicsburg Pennsylvania (DDMP) DICOMSS warehousing operation. The approach consisted of obtaining the proposed design, writing the simulation model in SLAM, and using workload data to validate the model. A simulation analysis was then performed on the proposed design. A pick-to-belt system coupled with a bar code sortation system were the main enhancements to the picking and palletizing area. An automated guided vehicle (AGV) system is to be employed to carry pallets from receiving to storage. Several significant recommendations were made concerning the design. The AGV system was not found to be cost effective. A second sortation belt is needed to alleviate congestion and to provide redundancy. In addition, numbers of specific resources (e.g., number of forklifts, turret trucks) to procure were also provided. (DLA-LO Project No. 6004)

87-07. Automated Bid Evaluation Program User's Guide (PC Version)
(November 1986)

The DLA Supply Center Contracting Directorates are responsible for selecting the lowest cost combination of bids on competitive solicitations. These bid evaluations can sometimes be very complex due to multiple line items and additional constraints imposed on offers such as minimum acceptable quantities, all or none conditions, acceptance of line items dependent upon award of other line items, etc. The Automated Bid Evaluation Program (ABEP) was developed to assist DLA contract specialists in handling these complex bids and determine, more quickly and accurately, the lowest cost combination of bidder responses to solicitations. The program is useable on a personal computer. (DLA-LO Project No. 5021)

87-06. The Impact of Contracting Initiatives On Leadtimes (November 1986)

This study investigated the effect of recent contracting initiatives on administrative and production leadtimes for items procured by the four DLA hardware Centers. After collecting and analyzing empirical data on administrative/production leadtimes, results indicate that while administrative leadtimes

continue to increase (in part because of competition initiatives), the leadtimes for competitively awarded large purchases were generally less than the leadtimes for similar sole source contracts. Items which were broken out from sole source to competition experienced reduced lead-times (approximately 30 days reduction in both administrative and production leadtimes) subsequent to the break out. (DLA-LO Project No. 5022)

87-05. Impact of Cycle Changes on DICOMSS (October 1986)

The object of this project was to evaluate the impact on workload at Defense Depot Mechanicsburg, Pennsylvania, resulting from the new 75 day order and ship time (OST) for the support of commissaries in Europe. A previous study (Analysis of Direct Commissary Support System (DICOMSS) Receipt and Issue Workload, see F-86-20) provided receiving and shipping workload data and analysis under previous 55-day OST using data from 10 Sep 85 - 25 Feb 86. These data were compared to data from 10 May 86 - 25 Sep 86 which reflected the new 75-day OST. It was concluded that the impact of the OST cycle change may slightly reduce DICOMSS operational requirements due to the slight decrease in MRO workload, smoothing of workload, and slight decrease in storage requirements.

87-04. A Review and Analysis of the DoD Materiel Returns Program (October 1986)

This report documents a study of the DoD Material Returns Program. The study discusses the current DoD materiel returns policies as contained in DoD Directive 4100.37, Retention and Transfer of Materiel Assets, as well as how the Military Services and DLA have implemented these policies. The major objectives of the study were to: (1) review and document current policies and procedures, (2) identify relevant economic and non-economic decision variables, (3) design a decision algorithm to assist the item manager in making the materiel returns decision, and (4) evaluate the potential costs and benefits which could be achieved by implementation. Actual returns transaction data from the Military Services and DLA for FY 1986 were used in the analysis. Cost estimates of the tasks and activities related to processing the return are also developed. The major finding from the analysis indicates that a significant increase in the volume of returns would be experienced by full implementation of the proposed criteria. The primary reason for this increase can be attributed to using an unconstrained policy for return of weapon system related items. A new decision algorithm for evaluating returns is proposed. The design attempts to minimize the risk of rejecting items that have a high possibility of reutilization while identifying to the item manager the reason for accepting the return. (DLA-LO Project No. 4028)

87-03. DLA Economic Retention/Returns Limits Study (September 1986)

The Defense Logistics Agency is required by DoDD 4100.37, Retention and Transfer of Materiel Assets, to develop economic retention limits that specify the amount of stock to be retained for economic reasons to meet future peacetime demand. This analysis used a breakeven equation to determine the maximum amount of stock that should be retained for economic reasons. The equation balances the two alternatives available: (1) to incur the cost to hold the stock until it is used or (2) to dispose of the stock and take the chance

that it may have to be reprocedured to meet a future demand. In the same manner, the economic returns limit was also investigated. The same breakeven equation was used, except that the expected cost to hold was increased by the cost to return the item to the wholesale depot. The results of the study support setting various economic retention/returns levels based upon the unit cost of an item and the expected remaining life of the item. The study recommends: (1) lower retention limits for those items with higher unit prices, and (2) extended limits for those items with lower unit prices. For less expensive items the returns limit is lower than the retention limit due to the inclusion of the cost of returning an item in the holding cost calculation. (DLA-LO Project No. 4029)

87-02. Economic Analysis Support For Automated Information System Control Board (AISCB) Working Group, Part I, Cataloging-Tools-On-Line (CTOL) Automated Information System Economic Analysis (August 1986)

Current DLA cataloging operations use a manual information system to prepare new item requests and maintain existing cataloging transactions. This economic analysis assessed the economic feasibility of replacing the current manual operations with a CTOL Automated Information System (AIS). Comparison analyses of costs and benefits were made between the current method of operation and the CTOL AIS proposal. Sensitivity analyses were performed on significant costs of the AIS proposal in order to address uncertainty in future cost estimates and to determine what effect any variation in these costs will have on the payback period. (DLA-LO Project No. 6024)

87-01. Depot Transportation "Efficiency Index" Performance Indicator (February 1986)

The objective of this project was to evaluate various transportation factors for inclusion in a composite index which will be meaningful to management in determining a depot's transportation efficiency. The efficiency index is composed of several factors. These factors include: ratio of bin shipping units sent by freight versus bin shipping units sent by mail; average number of shipping units for Government Bill of Lading (GBL); average GBL weight; ratio of shipping units sent by mail versus the number of GBLs. These factors are the terms of a linear combination. They were normalized and weighted and their sum represents the efficiency index. This report describes the process used to build an "efficiency index" to measure depot consolidation of Issue Priority Group III materiel release orders. Specifically, it details the selection of the factors used to construct the index, examines the behavior of each factor, describes the process used to develop a weighting scheme, and gives detailed instructions for computation of the actual index. (DLA-LO Project No. 6010)

86-27. Analysis of Annual Buys (August 1986)

This study evaluated the effects of implementing a minimum annual buy policy at DLA hardware supply centers. A computer model was developed to analyze changes in onhand inventory, contracting workload, storage requirements, safety levels, and funds utilization due to increased procurement cycles. Additionally, savings from increased order quantity price breaks are projected. The study shows that the main benefit of an annual buy policy is savings from price breaks rather than savings in contracting workload as previously expected. The

major costs of the policy appear to be not only increased inventory but also significantly increased storage requirements. The data also demonstrate that not all candidate items show a payback when procurement cycles are changed. (DLA-LO Project No. 5012)

86-26. Surface versus Premium Parcel Post Shipment Cost (July 1986)

The purpose of this study was to determine the transportation cost savings which could be realized by diverting Issue Priority Group (IPG) II shipments moving by premium air parcel to surface parcel post. Cost comparisons of actual costs using premium parcel shipments against estimated costs of the same shipments using surface parcel models were broken down by shipment origin (DLA depot), shipment destination (export versus domestic), and by parcel post zones. The results showed that the benefits of employing surface parcel post for IPG II shipments would be approximately 3.6 million dollars for all depots over a 1-year period. Savings were related to premium air parcel model, shipment weight, and shipment parcel post zone. In general, greater savings are available in express mail and first class mail shipments, in higher weight classes, and in higher parcel post zones. (DLA-LO Project No 6011)

86-25. Measuring and Controlling Price Trends in DLA Spare Parts and DPSC Commodities (June 1986)

This study was undertaken to develop improved methods to measure aggregate price trends in DLA Supply Center (DSCs) contracts. The major objectives of the study were (1) to develop a prototype cost-tracking computer program to measure and explain price trends, (2) to quantify the effect on prices from changes in buy terms (award quantities, degree of competition, acquisition method, and FOB terms), and (3) to develop the means of identifying contractors with unexplained price increases and decreases. The study recommends the incorporation of quantity discount factors into the standard economic order quantity model. The study also recommends the exportation of the prototype cost-tracking computer program to the DSCs for the purpose of measuring price trends on a recurring basis. A by-product of the study was the development of a personal computer program for use by buyers and price analysts to validate unit prices of individual awards. (DLA-LO Project Nos. 5005 and 5023)

86-24. Transportation Rate Tables User's Manual (June 1986)

This manual presents three cost estimating methodologies that can be used for estimating both first and second destination transportation costs. The three methods of estimating transportation costs provide different levels of accuracy. The three methods are: (1) state-based rates, (2) cluster-based rates, (3) mileage-based rates. The actual application of rates is left to the user. The rate structures lend themselves to FORTRAN and COBOL applications and could be modified for use in SPSS and SAS applications.

86-23. Economic Analysis Railway Operations at the Defense Construction Supply Center (DCSC) (June 1986)

The objective of this analysis was to determine if there are alternative means of accomplishing depot railway operations at DCSC at a lower cost. The study found that contract operations of intraplant rail service is not a viable

alternative. The railways contacted have little interest in providing this service. Although it might be profitable for a commercial concern to provide railway service in combination with other depot functions, such service is not large enough in scope to interest commercial activities. Since there is no legitimate alternative, the study recommends that the present system of in-house rail operations be retained.

86-22 Stock Fund Augmentation Study (May 1986)

This report presents an analysis of stocked new provisioning items. The objective of the study was to provide historical statistics on items for which DLA assumed management in FY 1978 through FY 1982. The statistical analysis includes the evaluation of historical demand and support control statistics and a comparison of demand dollars to historical provisioning obligation dollars. Findings indicated that between 8 percent and 19 percent of new items had a demand in their first year, while 17 percent of the new items did not have a single demand during the period observed (1978 to present). Demand increased over time, and the demand dollar figure reached the provisioning dollar figure on an average of 2-1/2 years after establishment of the new item. Findings also indicated that procurement cycle time increased significantly over the life of the new items. (DLA-LO Project No. 4025)

86-21. Economic Analysis of Automating the Meaningful Measures of Merit (M3) System (April 1986)

The economic analysis of automating the M3 system addresses the costs and benefits of M3 providing an alternative to the existing management information system, as used by the Defense Contract Administration Services Regions. The alternatives examined include: maintaining the status quo of presenting management information via the Management Information Report (MIR); automating the M3 and continuing the MIR; automating the M3 and deleting the MIR; implementing the M3 as a nonautomated system; and enhancing the status quo. (DLA-LO Project No. 6006)

86-20. Analysis of Direct Commissary Support System (DICOMSS) Receipt and Issue Workload (April 1986)

The purpose of this study was to assist the Defense Logistics Agency Mechanization Support Office in the design of modernized DICOMSS warehousing facilities at the Defense Depot Mechanicsburg Pennsylvania by providing them with receiving and shipping workload data and analysis. The approach used was to track receiving and shipping workload patterns for 12 14-day cycles. The results showed that item receipt patterns were stable. The majority of items were received and shipped in less than the minimum size lots. Storage location requirements were reasonably processed primarily by the case rather than the current procedure of building pallets from case lots.

86-19. Other Regulated Materiel - Consumer Commodity (ORM-D) Shipment Analysis (April 1986)

Air Force Regulation 71-4 is not consistent with the Code of Regulations, Title 49 with regard to having a proper shipping name of "Consumer Commodities" for ORM-D shipments. Accordingly, ORM-D shipped by military air are more costly

for DLA because of Air Force packaging and labelling requirements that are more stringent than for commercial air. The purpose of this analysis was to examine the inconsistency of the shipping nomenclature applied to ORM-D items and determine what impact these inconsistencies have on transportation charges for DLA shippers. The results of the study showed only minimal impact due to the very small quantity of DLA materiel shipped by military air.

86-18. Provisioning Analysis (March 1986)

This analysis quantitatively evaluated on an item-by-item basis the degree to which the Military Services are overforecasting/underforecasting their requirements for DLA-managed provisioned items. It involved an analysis of Supply Support Request (SSR) provisioning forecasts. The study approach was to create a provisioning/demand file, comparing actual demand to the forecasted SSR requirements; measure the extent of overforecasting or underforecasting; and determine how much of the demand received was from the Service that submitted the initial SSR. The major conclusion of the study was that quantities forecast on the SSR significantly overestimate the true Service Requirement. The results showed that during the first year, more than 90 percent of the items for which SSRs were submitted did not receive a demand. When demand for the second year was considered, the percentage of items without demand decreased to 69 percent.

86-17. Preliminary First Destination Guaranteed Traffic Cost Analysis (March 1986)

This report documents an analysis of transportation costs for vendor source shipments. The analysis examined the charges to move supplies throughout the Continental United States using surface freight modes of transportation. Comparisons were made of the actual first destination transportation costs and the transportation costs that might be realized using carrier rates associated with the Guaranteed Traffic Program (GTP). These comparisons determined the primary savings achieved by DLA using this program, the average savings based upon alternate carrier rates, and the savings using this program for various shipment weight categories. This study identifies the potential primary dollar savings made possible by the GTP. The analysis also determined regional cost trends and possible rate modifications for future carrier solicitations for the GTP. (DLA-LO Project No. 5018)

86-16. Contractor Shipment Distribution Patterns (February 1986)

This study used historical information to identify traffic shipping patterns from supply vendors to first destination depots or customers. The purpose was to identify those geographical areas where carrier performance improvements and cost reductions can be achieved by negotiating for transportation services under guaranteed traffic agreements. The results showed consistent shipping patterns among five of the eight transportation movement categories studied: Truckload/Trailer-On-Flat Car, Flat Bed Trailers, Drop-Frame Trailers, Box Cars, and Less-Than-Truckload categories. These five movement categories showed substantially high shipment frequencies and comparably large shipment tonnages over a period of 1 year. As a result of the study, it was recommended that transportation services and costs be negotiated for those five movement categories. Because of the limited number of shipping patterns for Heavy Duty

Flat Cars and Flat Cars, transportation services should be designated for those areas where traffic is most recurring. Traffic using Tank Trucks/Tank Cars are infrequent and shipping tonnages are low, and thus it does not appear to be advantageous to consider guaranteed traffic for bulk liquid shipments in any conveyances. (DLA-LO Project No. 4011)

86-15. A Study of Demand Forecasting in the Defense Logistics Agency
(February 1986)

The goal of this study was to identify alternative methods which would increase the accuracy of DLA's demand forecasts. The study compared 18 different forecasting methods to determine if improvements over the current DLA forecasting method could be obtained. The methods were compared using both forecast error and impacts on inventory system variables as criteria for judging improvement. The results showed that a weighted average of the forecasts of single exponential smoothing and the four-quarter moving average produced the best results. The preferred method produced a 3.9 percent decrease in the average forecast error over the current system. Positive impacts on safety level dollars and other inventory variables would also be realized.

86-14. Audit of DLA Automated Data Processing/Telecommunications Contracting
Office Cost Evaluation Model for ADP Systems (February 1986)

The purpose of this project was to evaluate and analyze the Cost Evaluation Model for ADP Systems used by the DLA Automated Data Processing/Telecommunications Contracting Office. The model was found to be valid and accurate, with no structural program flaws. The formula used to compute present value precisely reflected to 10 percent discount values mandated by DoD. Experimental runs of test data proved the computational logic to be accurate. A tendency of the model, however, to accept erroneous data could significantly distort evaluations and make results meaningless. There was also found to be a lack of both internal and external documentation which underscores a potential problem facing successive administrators tasked with maintaining the model. (DLA-LO Project No. 5025)

86-13. Management by Objectives (MBO) Accounting Program User's Manual
(January 1986)

This user's guide describes the MBO Accounting System Program used for automated storage of all DLA MBOs. The MBO Accounting System Program is interactive in that it allows the user to input, update, and retrieve information about MBOs through user responses to a series of menus. The program is custom built in the dBASE III programming language to require a minimum of user familiarity with programming or data base concepts. The user of this program needs only a casual understanding of microcomputers to begin using it. A step-by-step description of the use of the program is contained in the user's manual. Technical information about the data structures and a program listing is also provided. (DLA-LO Project No. 5015)

86-12. Estimate of the Impact of TRAMS on Personnel Requirements
(January 1986)

The purpose of this study was to arrive at a "best estimate" of the number of personnel required to perform the DCAS transportation management functions once the Transportation Management Systems (TRAMS) is implemented in the DCASRs. The study examined the impact of both centralization and automation due to TRAMS on personnel resources. To project the centralization impact, the study used organizational theory and span-of-control theory. To assess the automation impact, the study looked at the tasks and associated time covered by Special Purpose Data (SPD) and the time and associated tasks that are unmeasured on an individual basis. (DLA-LO Project No. 6007)

86-11. DCASR Data Input Workload Capacity Study (January 1986)

A recent enhancement of the Mechanization of Contract Administration Services (MOCAS) system is the development of an online capability for data input, which is replacing a batch method of data input. The purpose of this study was to develop standards or threshold values for system response times for the online input of contractual documents. Such standards would be the maximum allowable response times which would permit the backlog of documents awaiting input to be kept within an acceptable range. A related aim of the study was to measure the data input productivity improvement associated with the new online system. It was recommended that screen-to-screen response time should not exceed 6 seconds, and summary edit response times should not exceed 68 seconds. Within these times, the backlog of documents awaiting data input will be within acceptable limits. The results also showed that the number of documents per day that an input clerk can process on-line will increase by roughly 15 percent over the batch input method. (DLA-LO Project No. 4024)

86-10. Uniform SAMMS Inventory Management Simulation (USIMS) User's Guide
(January 1986)

Inventory management within DLA is accomplished with the aid of the DLA Standard Automated Materiel Management System (SAMMS). USIMS is an operations research tool which permits evaluation of alternative inventory policies or environmental impacts on the performance of the DLA Supply Centers. USIMS uses a small sample of items in conjunction with a Monte Carlo simulation of various key SAMMS events to produce a wide range of inventory statistics on a proposed set of inventory policies. This USIMS User's Guide provides a complete description of the model and information on how to execute it. (DLA-LO Project No. 5002)

86-09. Physical Inventory Record Accuracy Indicator (January 1986)

DLA currently uses four primary measures to evaluate the physical inventory record accuracy of DLA Supply Centers (DSCs), Defense depots, and Military Service depots storing DLA materiel, but these indicators may conflict. This report describes the results of a study designed to develop a new, single measure of physical inventory record accuracy that can be used to evaluate the relative performance of DSCs and depots. The study examined the measures currently used to indicate physical inventory record accuracy and documents the results of a series of interviews with subject matter experts to determine the

components to be included in the new indicator. An automated decision support system was used to help selected experts assign numerical weights to each component to reflect its relative importance. The results include three new physical inventory record accuracy indicators, one each for DSCs, DLA depots, and non-DLA depots. Each of these indicators will permit an unambiguous ranking of the performance of its respective activities, showing where management attention is most needed. (DLA-LO Project No. 5011)

86-08. Effect of Changing Depot On-Time Standards (December 1985)

This study evaluated the potential consequences of changing the DLA "on-time" standard for depot handling and Continental United States (CONUS) delivery of supplies for routine requisitions (Issue Priority Group Three) from military customers. For the purpose of improving the cost effectiveness of DLA depots, it was proposed to extend the standard from the current 15 days. The analysis consisted of estimating several measures of comparison for the baseline (15-day) and alternative (12-, 18-, 21-, and 24-day) time standards. The primary measures were transportation charges, numbers of shipments according to type, numbers of shipping units, and on-time performance. The findings showed that changing the time standard to 21 days would save approximately 5 million dollars annually in transportation charges alone, without significantly impairing the mission of responding to military customers. (DLA-LO Project No. 5001)

86-07. Cost Benefit Analysis of Publishing DLAM 4140.2 on Microfiche (October 1985)

This analysis was conducted to determine the cost effectiveness of converting DLAM 4140.2, Supply Operations Manual, from paper to microfiche and distributing it thereafter in microfiche form. A questionnaire was sent to the actual users of the manual to aid in the evaluation of the proposal. Three alternatives of status quo and microfiche combinations for meeting the requirements of the proposal were identified and treated in the analysis. Extensive effort was made to obtain cost estimates reflecting current costs. Present value analysis was used to evaluate the comparative cost of investment alternatives. The results showed that conversion to microfiche from magnetic tape is the least costly alternative. However, since the Distributed Minicomputer System project currently underway is expected to provide direct access to most major publications, the conversion of DLAM 4140.2 to microfiche as an interim process is not recommended.

86-06. Cost Benefit Study on the Use of Aluminum versus Wooden Skids in Transporting Industrial Plant Equipment (October 1986)

This study was performed to find a cost effective alternative to the present practice of shipping DoD-owned industrial plant equipment on aluminum and wooden skids. The analysis established that it may be more economical for the Government to switch to an all-wood operation. Considerable savings could be realized even under current operating practices by returning to storage for reutilization those wooden skids presently discarded after one use. (DLA-LO Project No. 4027)

86-05. Evaluation of Demand Forecasting Techniques for the Subsistence Commodity - Volumes I and II (October 1985)

This study involved the evaluation of quantitative techniques to improve subsistence forecasting. The forecasting techniques analyzed included autoregressions; autoregressions with seasonal terms; simple moving averages, single, double, adaptive, and combined exponential smoothing; naive; and the current DLA methods. Findings showed that about 20 percent more variability in leadtime demand and 14 percent more variability in procurement cycle demand was experienced during the 1980-1983 time period than could have been achieved by a group of five methods identified in this study. The report recommends different groups of techniques for different categories of subsistence items. A prototype subsistence demand forecasting system is described based on the recommended group of models in this study. This study serves as the analytical basis for the development of the Forecasting Module of the Defense Integrated Subsistence Management System. (DLA-LO Project No. 3039)

86-04. The Conceptual Design of an Automated Mobilization Management Information System (September 1985)

This report defines a logical and potentially achievable set of models and automation systems which will calculate the mission status and capacity of the DLA materiel acquisition, storage, and distribution processes under moderate to severe contingency and mobilization scenarios. The report also identifies the specific actions and resources required to develop the set of models and systems. (DLA-LO Project No. 4017)

86-03. Analysis of a Demand Recording Anomaly (September 1985)

This study analyzed a Standard Automated Materiel Management System (SAMMS) inconsistency between the distribution and requirement subsystems. The purpose of this analysis was to determine the urgency of implementing a SAMMS system change request to correct a current deficiency which may lead to malpositioned stock and increased transportation costs. The results showed that the percentage of stock misrecorded is small and the amount that could be malpositioned would not be located at a depot that is much further from the customer than the optimal storage depot would be. (DLA-LO Project No. 5014)

86-02. DLA Materiel Readiness Support (MARS) System Interface with Service Readiness Models (September 1985)

This project investigated the potential for interfacing the DLA MARS System with the "sparing-to-availability" models of the Military Services. Although DLA is the DoD wholesale manager of millions of consumable items, it lacks a means for determining how it impacts on the materiel readiness of the Services. This shortfall could be filled by interfacing the MARS System with the models of the Services. The report reviews the capabilities of the MARS System and then considers three popular Service models. The study concludes that an aggregate analytic model approach could be used to relate consumable stock fund investment to weapon system availability by further development of the MARS System. A detailed line item, multi-echelon model approach is ruled out due to lack of application data and the commonality of parts. (DLA-LO Project No. 3087)

86-01. Review of SAMMS Requirements Computations (August 1985)

This review was performed in order to ascertain the effectiveness and efficiency of each of the Standard Automated Materiel Management System (SAMMS) requirements levels pertinent to inventory control in DLA. Each identified requirements level is documented and analyzed to identify potential problems in methodology and implementation. Topics covered include stockage criteria, economic order quantity, leadtime demand quantity, safety level, program-oriented items, life-of-type buys, government furnished materiel, nondemand based levels, control levels, retention limits, credit levels, maximum release quantity, and other war reserve materiel requirements. The findings and conclusions address identified problem areas, potential solutions, and recommended efforts for the development of new methodologies. (DLA-LO Project No. 3040)

85-09. Cost Benefit Assessment and Tracking System (COBATS) User's Guide (August 1985)

This guide provides the information and instructions necessary to operate the automated Cost Benefit Assessment and Tracking System (COBATS). COBATS is a decision support system (DSS) designed to aid personnel in monitoring and tracking costs, benefits and savings for automated information systems, and in performing economic analyses quicker and more accurately. COBATS computes life-cycle costs, compares and ranks alternatives, graphically displays the results of economic analyses, and places the data in a number of possible output options. In addition, COBATS is able to record required data from DLA Form 558-B on Automated Information System (AIS) System Change Requests (SCRs), conduct cost dominance rankings, sort SCRs by priority or payback period, compare SCRs, and generate reports. (DLA-LO Project No. 4007)

85-08. Development of DCAS Cost to Order for DoDI 4140.39 (August 1985)

This report provides estimates of the Defense Contract Administration Services (DCAS) variable cost to order on a per-item basis by procurement instrument. The data base used to develop these cost estimates was obtained from DLA management information systems, a sample of DCAS closed contracts, and a sample of DCAS active contracts. This study also developed a proposed cost to order model that determines the total variable cost to order for an Inventory Control Point. After an in-depth investigation of the collected data, it was concluded that (1) the DCAS variable cost to order elements depicted in DoDI 4140.39 are no longer current cost elements; and (2) the duplication of certain functions, such as preaward surveys and contract administration, by different organizations has resulted in confusion and unnecessary inaccuracies in developing the variable cost to order for an "average" item. (DLA-LO Project No. 4001)

85-07. Long Supply Study (August 1985)

In 1984, the Revolving Fund Budget Division of DLA's Comptroller requested a study of long supply inventories, specifically materiel returns without credit, to examine how these assets contributed to inventory growth. An item is defined as being in long supply status if its asset position exceeds its normal requisitioning objective. A data analysis was conducted on long supply assets

to determine the extent to which those assets remain in long supply, what portion of these assets are processed to disposal, and what portion is used as operating stock in subsequent years. Due to the nonavailability of data, materiel returns without credit could not be identified in the analysis. (DLA-LO Project No. 3084)

85-06. Update of Workload Factors in the DLA Mobilization Plan (July 1985)

The objective of this project is to derive updated Inventory Control Point (ICP) and depot workload factors (such as lines and tons shipped, number and dollar value of buys generated) to be used in estimating any resource shortfalls for the DLA Mobilization Plan. This project used selected Time Phased Force Deployment Data (TPFDD) to derive demand quantity and frequency factors that would apply to a full scale mobilization. The Uniform SAMMS Inventory Management Simulation (USIMS) Model was used to simulate the mobilization workload and performance at ICPS. Mobilization planning factors for the first three months of a mobilization were developed for DLA depots, hardware Centers, and the medical commodity. (DLA-LO Project No. 5007)

85-05. DLA Operations Research Analysis Network (DORAN) Economic Analysis (July 1985)

The DORAN was established to implement a comprehensive automated operations research data base and computational facility. The purpose of the economic analysis was to determine the most cost effective means of providing future processing and telecommunications requirements for the DORAN. Alternatives were developed to meet projected DORAN processing and telecommunications requirements through an eight year system life cycle. Configurations based on the alternatives were costed and analyzed across their projected life cycles. Costs were based on historical rate and usage information, actual contract prices for selected equipment, and maintenance and service contracts currently in use by DLA. Standard economic analysis techniques were applied to determine the discounted cumulative net present values for each alternative. This report summarizes the analysis performed and findings produced and recommends a course of action to be implemented by DLA. (DLA-LO Project No. 4015)

85-04. High Priority Small Package Analysis (June 1985)

This analysis was undertaken to determine cost impacts of diverting shipments to alternate modes of transportation. Comparisons were made of expenditures under the Guaranteed Air Traffic Program, the United Parcel Service (UPS), and/or U.S. Postal Service. A suggestion to use the UPS second service was made in lieu of the use of rates and services agreed upon and covered by the negotiated Guaranteed Traffic Program. The results of this analysis concluded a 14 percent cost savings could be achieved by use of the alternate mode. The greatest potential for savings is attributed to diversion of Non-Mission Capable Supply (NMCS) next day service to the slower service by the United Parcel Service. (DLA-LO Project No. 5009)

85-03. Comparison of Forecasted Provisioning Requirements versus Experienced Demand (April 1985)

This study compared the actual demands for new provisioning items to forecasted requirements on supply support requests (SSRs) which are being submitted by the Military Services. The objectives of this study were to determine (1) the validity of initial SSR submissions and (2) the impact of using requirements from follow-on SSRs. It was found that the total requirements estimate using initial SSR quantities, in terms of acquisition value, to be 349 percent greater than the actual demand. The inclusion of follow-on or reprovisioning SSRs increased that percentage to 409 percent. (DLA-LO Project No. 3033)

85-02. Analysis of the Program Oriented Item System for Forecasting Clothing Items (January 1985)

This study examined the extent and cause of forecast error in the Program Oriented Item (POI) system. The report compares the forecasted demand for POI items to actual demand for those items and summarizes the degree of forecast error. Other areas which might contribute to forecast inaccuracy, including the effect of item seasonality on demand and the accuracy of the Services' troop strength projections, were examined. The report presents the results of data analyses and provides conclusions and recommendations in each of the above areas. (DLA-LO Project No. 3036)

85-01. Improving the Forecasting of DLA Production Leadtimes: A Feasibility Study (January 1985)

In April 1984, the Defense Logistics Agency (DLA) requested the Institute for Defense Analyses (IDA) to undertake a six-month feasibility study to ascertain the likelihood that economic analytical techniques could improve its production leadtime (PLT) forecasting accuracy. The study concluded that (1) a significant cyclical component exists in DLA PLT data that is not captured by existing projection techniques; (2) leadtime economic indicators can capture this cyclical component successfully; (3) multiple linear regressor such as projections with a leading indicator regressor can result in significant reduction in forecast error dispersion; and (4) that such models can also eliminate or reduce an upward bias in DLA forecasts that may exist under current practice. (DLA-LO Project No. 3030)

84-22. Transit Time Analysis (December 1984)

This analysis computed the transit time for shipments from DLA depots to points within the continental United States. Various sources were used to establish baseline transit times for use in DLA Guaranteed Traffic solicitations and to provide a basis for grouping destination areas by transit time for use by DLA depots in workload planning. Statistics were developed from Freight Information System (FINS) and Military Standard Transportation and Evaluation Procedure (MILSTEP) data tapes. These statistics indicated that the mean and median shiptime of TK4 and FIN data differed in most cases by less than half a day. (DLA-LO Project No. 3045)

84-21. Hazardous Materials Storage Projection (October 1984)

As a result of the DLA stock positioning policy for hazardous items, three depots were assigned as primary hazardous materials stockage depots. These three depots experienced significant increases in the workload and storage space required to handle these items. Through data collection, identification, and analysis, it was determined that the isolation of hazardous materials to the three designated depots is far from complete. In 1983, large quantities of hazardous materials were shipped from depots other than Richmond, Memphis, or Ogden. The large discrepancies between performance and actual DLA experience in 1983 suggests that there were significant exceptions to the policy of isolating hazardous materials to three depots. (DLA-LO Project No. 3062)

84-20. Data Base Management System (DBMS) Environmental Response Time Study (December 1984)

This report documents the development of standards and/or threshold values for DBMS response times for the on-line input of contractual and delivery documents into the Mechanization of Contract Administration Services (MOCAS) system. Two cases were considered in developing threshold values for acceptable response times. The first case corresponded to a normal level of workload which is experienced for most of the year; the second case corresponded to surge level in workload which is experienced near the end of the fiscal year. Through the use of a model simulating the data input process, threshold values were obtained for case one. But, due to the high level of workload, it was not possible to establish threshold values for response times because accomplishment of document backlog goals could not be achieved without overtime. (DLA-LO Project No. 4019)

84-19. Validation of Weights and Cubes of Army War Reserve (December 1984)

The Army requested DLA's assistance in verifying weight and cube data for Army war reserve items. A sample of items was weighed and cubed in the depot, and these weights and cubes were compared to those in the Army Master Data File. It was discovered that a considerable amount of error existed in the Army Master Data File weights and cubes. About 85 percent of the items had weight errors. The error was greatest for larger items in the medical commodity. (DLA-LO Project No. 3061)

84-18. Single versus Multiple Shipment Impacts (October 1984)

The purpose of this project was to determine the implications, in terms of transportation costs, transit times, and potential for fraud on small Government bills of lading, of alternative consolidation and delivery scenarios for shipments to Air Force installations. The scenarios compared included central receiving only, separate deliveries to multiple consignees, and delivery by stop-offs or split shipments to multiple activities. The analysis was based on historical materiel release order records reflecting shipments from all six DLA depots to all CONUS Air Force bases during the months of April 1984 through June 1984. (DLA-LO Project No. 4026)

84-17. Unit Price Comparison between FY 83 and FY 84 (September 1984)

This report documents the results of an in-depth validation of a computer program which compared the unit prices of items purchased in FY 84 with the unit prices of the same items purchased in FY 83. The purpose of this validation was to assess the validity of the apparent price reductions and to determine the reason or reasons for the reductions. The test results showed that while the program accomplished its basic intent, problems with input data and file completeness made the results less than reliable. (DLA-LO Project No. 4018)

84-16. Binface Action Feasibility Study: Automated Warehousing and Retrieval System (September 1984)

This report describes the application of computer simulation in the Automated Warehousing and Retrieval System (AWARES) at the Defense General Supply Center. The purpose of this study was to determine the feasibility of combining the picking and stowing functions in the AWARES. The results, obtained through a simulation model, showed that it is feasible and practical to accomplish the normal picking and stowing workload in AWARES on one shift. (DLA-LO Project No. 4005)

84-15. Materiel Readiness Decision Support System Interface Prompting Guide (July 1984)

The DLA Materiel Readiness Support (MARS) System provides a method for a user to obtain statistics about DLA's supply performance. The full capabilities of MARS allows for analysis of historical support to a weapon system(s) and/or organizational unit(s), predictions of future support to a weapon system, nonweapon system, and/or a Service, and analysis of item data. The prompting program described in this report is concerned with historical or future support and attempts to bridge a gap between the end user and the computer by providing a semi-automated means to generate the necessary computer commands to execute the required parts and functions with MARS. (DLA-LO Project Nos. 3031 and 3086)

84-14. Materiel Readiness Decision Support System (October 1984)

The Materiel Readiness Support (MARS) System was developed as an analytical tool to evaluate DLA's support to weapons system materiel readiness. This report is a user's guide for the MARS System. The guide documents the various system components: The Historical Supply Performance Program, The Projected Supply Performance Model, and the Item Statistical Package. The mathematical development of the model, the program structure, the analytical use of the various components, and the MARS System database are included in this documentation. (DLA-LO Project Nos. 3031 and 3086)

84-13. Certification of DFSC Bid Evaluation Model (September 1984)

This study reported an independent certification of the Defense Fuel Supply Center (DFSC) Bid Evaluation Model (BEM). The BEM is used to determine the least cost combination of fuel vendors and transportation modes for each fuel procurement cycle. The BEM uses the DATAFORM (linear programming matrix

generator) language and other related software. This certification effort consisted of (1) a top-level review of each component of the matrix generator, and (2) running several simple and hypothetical test cases. The test cases, run on a personal computer using a network algorithm, were compared to the BEM output. Based on the results of the test cases and the review of the model code, it is concluded that the BEM performs as intended, and that any awards determined by the model are correct and defensible. (DLA-LO Project No. 3073)

84-12. Project Management System (PMS) User's Manual (September 1984)

As workload with the DLA Operations Research and Economic Analysis Office continued to expand, it became necessary to develop a uniform, easy-to-use system for reporting and managing the office's multitude of projects. The PMS is intended to provide all the necessary management information, while at the same time keeping the administrative workload of project reporting to a minimum. The objective of this User's Guide is to provide users with instructions necessary to effectively use the PMS. The User's Guide covers five PMS modules: Weekly Activity Reporting; Monthly Status Reporting; Management Reporting; New Activity Entry/Assignment; and Completed Project Reporting. (DLA-LO Project No. 3060)

84-11. Movement of Stocks from Attrition Sites (September 1984)

This study was generated by DoDI 4140.49, Movement of Stock from Attrition Sites, which requires that the movement (or nonmovement) of stocks at attrition sites be evaluated using a break-even cost formula prescribed in the Instruction. Variables used in the formula were quantified and a break-even point determined for moving stock to other stocking depots. (DLA-LO Project No. 3042)

84-10. Economic Analysis for the SAMMS Modernization (July 1984)

Final report prepared by Advanced Technology.

This report represents a preliminary economic analysis for DLA's modernization of the Standard Automated Materiel Management System (SAMMS). The analysis examines four alternatives to the current baseline, each with three different levels of automation. The economic analysis revealed that sufficient savings and benefits were present in each of the proposed alternatives to the baseline to justify continued development of the SAMMS modernization effort. (DLA-LO Project No. 3058)

84-09. Plan Relating End Item Readiness to Supply Management (June 1984)

This plan was prepared in response to a tasking from the Office of the Assistant Secretary of Defense (Materiel, Installations and Logistics) concerning consideration of end item readiness in inventory management. This plan presents an approach for developing requirements models with weapon system availability goals and for developing analytic models for projecting programming and budget requirements for weapon system inventories. The plan addresses automated systems impacts, resource requirements, policy/procedures impacts, organizational impediments, and time-phased action plans. (DLA-LO Project No. 4013)

84-08. Freight Shipments Under 70 Pounds (June 1984)

All surface Government Bills of Lading (GBL) shipments under 70 pounds made by DLA depots in FY 83 were reviewed. Each shipment was rated by U.S. Postal Service (USPS) and United Parcel Service (UPS) rate tables, and estimated costs and savings were calculated. It is estimated that DLA could save approximately \$1.5 million annually by increasing parcel post eligibility from 50 to 70 pounds, and by establishing small parcel post eligible shipments. (DLA-LO Project No. 4009)

84-07. Emergency Planning and Assessment Model (EPAM) (June 1984)

The EPAM was designed to assist DLA emergency planners in the realignment of resources, determination of additional requirements, and estimating potential costs in the event of a natural catastrophe occurring at an Inventory Control Point (ICP) or depot facility. Both the ICP and depot problems are formulated in a linear programming format. Each model consists of a cost objective function which is minimized subject to constraints relating to personnel, materiel, facilities, and equipment. (DLA-LO Project No. 3054)

84-06. Cost to Order Study (June 1984)

The costs to order which DLA uses in the computation of economic order quantities (EOQs) for its items were developed about 1972. This study examined the impacts of (1) using updated costs to order; and (2) changing the constraints which DLA applies against EOQs. The examination was conducted by simulating the use of updated costs and changed constraints on DLA's inventory management simulation. The major finding was that the use of updated costs would produce an increase in the number of procurement requests without improving performance. The study concludes with recommendations for minimizing the negative impacts of using updated costs. (DLA-LO Project No. 3043)

84-05. Procurement Workload and Manpower Correlation Analysis Study (June 1984)

This report documents a linear regression analysis which was used to develop predictive equations for a set of procurement manpower and workload indicators. This analysis will aid in (1) determining the most reliable predictors of workload and manpower and (2) evaluating the mission program performance of the DLA Supply Centers (DSCs). The analysis conducted to develop the linear regression models was based on data from four DSCs and their totals. First, with the Statistical Package for the Social Sciences (SPSS), correlation matrices were developed to determine the relationships between indicators; and then multiple linear regression analysis with stepwise inclusion to compute the statistics for developing the many alternative regression equations. Various statistical criteria of judging the "best" equations were applied to the alternative equations, and 74 optimal equations were selected. The results of this study indicate that the DSC-Total data base provides better predictive equations than the individual DSC data bases, and that number of manpower and workload indicators are good predictors. (DLA-LO Project No. 3056)

84-04. Economic Analysis System (EASY) (June 1984)

EASY is an interactive system designed to support anyone performing an economic analysis. EASY consists of five FORTRAN programs; namely, EASYT, EASYI, EASYD, EASYE, and EASYR. EASYT is the tutorial that describes the individual modules within EASY. EASYI is the input program through which the user creates a data base for his economic analysis. EASYD is the display program which allows the user to display his data base. EASYE is the edit program through which the user can make changes to his data base. EASYR is the report program which uses the data base to perform the analyses and prepare the report associated with an economic analysis. (DLA-LO Project No. 3052)

84-03. Carousel Loading Study (May 1984)

The need for productivity improvements in depot operations has led to the acquisition of high density storage systems such as carousels. A model has been developed to load these systems with items so as to optimize their operation in terms of both productivity and throughput. The model is based upon the concept of maximizing the pick density of items stored within the system, and in doing so, selecting the proper items to stock and at what level. The model has been used to load carousel systems at DLA depots with good results. (DLA-LO Project No. 3047)

84-02. Analysis of Air Force European Requirements Through Container Consolidation Points (CCP) (April 1984)

This report summarizes shipping trends of Air Force European requirements which flow through Warner Robins AFB CCP for Defense Depot Mechanicsburg CCP. The report depicts stockage objectives and traffic flow of eligible items subject to the consolidation point criteria. The results suggest change in the stock positioning policy to reduce pipeline transit times and transportation cost. (DLA-LO Project No. 4003)

84-01. Inventory Frequency Analysis (February 1984)

The purpose of this study was to develop a program that scheduled inventories as an item neared procurement. Other variables included in the program to give the candidate items a weighted importance scheme were: weapon systems codes, annual dollar demand, annual demand frequency and time since last inventory. The model prioritizes NSNs stocked at a depot for inventory on a cyclic basis. The major constraint of the model was that the number of inventories performed had to be less than or equal to the number of inventories currently being performed at that depot. (DLA-LO Project No. 3037)

83-08. Automated Warehousing and Retrieval System (AWARES) Support (December 1983)

The Defense General Supply Center (DGSC) has implemented an AWARES to manage warehousing functions by computer control. This system was in direct competition with four carousels storing relatively fast moving stock and which were still being managed by the old paper document method. A study was initiated to determine whether to (1) leave the two systems as they were; (2) somehow integrate the two systems; or (3) discontinue use of the carousels. An

in-depth, cost-benefit analysis was performed on these three alternatives using historical data, time and motion studies, and computer simulation. The final recommendation was to discontinue use of the carousels with a total estimated savings of \$1 million. (DLA-LO Project No. 3059)

83-07. Clothing and Textile Distribution Study (December 1983)

This study examined demand patterns in clothing and textiles (C&T). Using FY 82 data, a series of analyses were carried out which examined number of materiel release orders (MROs), dollar value shipped, weight and cube shipped, and total transportation cost. These measures were then examined for various customer characteristics, e.g., initial issue (Recruit Induction Centers) versus replenishment (Military Clothing Sales Stores), male versus female, service overseas theater, C&T geographical region, and customer cluster. Also included were freight and parcel post costs from depots to high demand customers. (DLA-LO Project No. 4021)

83-06. Economic Analysis of Alternative Shipping Methods to Provide Accountability of Small Parcels (August 1983)

This analysis depicts the costs for shipping small parcels via alternative methods which provide for the accountability and traceability (tender receipts) of parcels. The study was limited to one quarter of requisition history data to determine the mode and dollar value of the shipment. A comparison of freight, United Parcel Service, and the U. S. Postal Service costs was made considering insurance fees when applicable. The results suggested the shipment of all small parcels via the United Parcel Service with the exception of overseas shipments routed via the APO or FPO system. (DLA-LO Project No. 3025)

83-05. Final Report on the Review of Single Source Justification (August 1983)

This report was prepared by the Competition Lab-Group of the Acquisition Improvement Steering Committee. Specifically, the tasking was to develop and execute a statistically valid sampling plan in order to determine the proportion of DoD noncompetitive contracts dollars that were attributable to the various justifications for single source procurements. (DLA-LO Project No. 3020)

83-04. Cost Analysis for the Automation of Primary Level Field Activity (PLFA) Libraries (June 1983)

This study concerned the proposal for automation of the PLFA libraries. A cost analysis for providing specific services to the PLFA libraries was conducted. Fifteen libraries were identified as candidates for automation receiving some or all of the seven selected on-line data services. (DLA-LO Project No. 3019)

83-03. Depot Workload Forecasting (March 1983)

DLA Supply Centers had been using a moving average forecasting model to estimate tons shipped and tons received for each depot where their commodity is stored. The current model had been performing poorly in recent forecasts. A study was initiated to determine if double exponential smoothing or the

Box-Jenkins technique would perform better than the current model. The conclusion was that double exponential smoothing would provide significant improvements in forecast accuracy.

83-02. Cost Comparison of a COPAD Type Operation to Support Items Currently Stocked (March 1983)

This cost comparison was conducted to delineate the costs associated with a Contractor Operated Parts Depot (COPAD) type operation for selected NSNs versus the costs to manage these NSNs for stock. (DLA-LO Project No. 3021)

83-01. Variable Safety Level (VSL) Constraint Study (February 1983)

This paper examines the performance and cost impacts of relaxing or removing the current leadtime demand constraints on DLA's variable safety level. It documents the approach, references, mathematical derivation, and supporting DLA data used in examining the impacts.

82-04. Variable Safety Level for Nonperishable Subsistence (November 1981)

This paper documents the mathematical development of a time-weighted, essentiality-weighted, requisitions short variable safety level model for nonperishable subsistence items. It also includes guidance for implementing the model in the Defense Integrated Subsistence Management System (DISMS).

82-03. System Change Request Study (November 1982)

This study investigated the need for a simplistic cost/benefit evaluation format for System Change Requests (SCRs) and, if needed, to develop such a format. The feasibility of auditing the claimed savings of SCRs after they are implemented was considered, as well as the level of difficulty involved in filling out forms and passing SCR-related documentation through the respective channels.

82-02. Item Reduction Quantitative Value Review (June 1982)

This study identified the elements of cost/savings associated with eliminating items from the Federal Supply System, and quantified the benefits in terms of dollars.

82-01. Economic Analysis of Administrative Space for DCASMA Inglewood (February 1982)

This economic analysis investigated the costs of two alternatives whose function would be to provide building space for the Defense Contract Administration Services Management Area (DCASMA) located in Inglewood, California. One alternative involves the continued leasing of commercial space which the DCASMA currently occupies. The other alternative involves moving the DCASMA into a nearby Government-owned building which is currently unoccupied. Present-value analysis was used to identify which alternative was the more economical over a 28-year period.

81-06. Economic Analysis for the Consolidation of Packaged Petroleum Products Function at Either Defense Fuel Supply Center (DFSC) or Defense General Supply Center (DGSC) (November 1981, Revised January 1982)

This economic analysis was conducted to determine the costs associated with consolidating the packaged petroleum products inventory control point (ICP) functions that are currently split between DFSC in Alexandria, VA, and DGSC in Richmond, VA.

81-05. Report on Backorder Review (October 1981)

This review was aimed at identifying the causes of backorders and possible approaches to reducing their number. The leading causes of backorders were found to be unforecasted demand, delinquent deliveries, extended leadtimes, contracting difficulties, inventory loss, and logistics transfer. In seeking ways to reduce backorders, the study looked at forecasting techniques, use of program data, demand variance, item grouping, customer research, administration and production leadtimes, delinquent deliveries, safety levels, budget restrictions, market research, automated materiel management, etc.

81-04. Analysis of a Proposal to Reduce Out-of-Area Shipments in the DLA Medical Commodity (October 1981)

This report describes the analysis of a proposal to reduce out-of-area shipments in the DLA medical commodity. The computer simulation model used to test the proposal is documented and results and conclusions are provided. This analysis was performed in response to the 25 June 1980 GAO Report, "Better Controls and Data Needed to Distribute Medical Supplies," (LCD-80-77) (OSD Case #5408).

81-03. Economic Analysis of Administrative Space for DCASMA Denver (April 1981)

This economic analysis was conducted to investigate alternative methods for providing administrative space for the Defense Contract Administration Services Management Area (DCASMA) located in Denver, Colorado. Three feasible alternatives of construction and lease combinations for meeting this requirement were identified and treated in this analysis. Extensive effort was made to obtain cost estimates reflecting current costs. Present value analyses were used to evaluate the comparative cost of investment alternatives. The summary analysis shows leasing to be the least costly alternative.

81-02. Program Evaluation of Functions for Packaged Petroleum Products (March 1981)

This study was conducted to determine if the split in functional responsibilities for packaged petroleum products between DGSC and DFSC, where DFSC had procurement responsibility and DGSC had technical and supply management functions, was the dominant contributor to the current supply availability deficiencies; and, if so, how best to modify current operations, along with cost assessments in order to enhance supply availability.

81-01. A Review of the GSA Economic Study to Relocate DCASMA Pittsburgh
(January 1981)

This study determined the most cost-effective space accommodations for Defense Contract Administration Services Management Area (DCASMA) located in Pittsburgh, the National Labor Relations Board Regional (Pittsburgh) Office, and the Defense Contract Audit Agency Office also located in Pittsburgh.

80-03. Contractor Operated Parts Depot (COPAD) Benefits (December 1980)

This study identified three benefits to DLA customers of reduced order and shipping time: (1) reduced inventory for stocked items; (2) reduced pipeline for nonstocked items; and (c) reduced manpower. It was concluded that COPAD improved vehicular readiness by \$14.4 million based on a fleet size of \$1.2 billion and improved the number of vehicles down for parts by 1.2 percent. Manpower savings were estimated at \$2.5 million annually.

80-02. Development of Economic Models for the Retention of Idle Plant
Equipment in the General Reserve (May 1980)

This paper describes the development of economic decision models for the retention of idle plant equipment by the Department of Defense (DoD). Separate models were developed to accommodate the three different occasions when the Defense Industrial Plant Equipment Center (DIPEC) must decide to hold or not hold a piece of idle plant equipment in the DoD General Reserve. They are the add model (for when the decision is to add or not add to the Reserve a piece of equipment declared idle); the retain model (for when the decision is to retain or not retain an idle piece of equipment in the Reserve); and the exchange model (for when the decision is to exchange or not exchange a piece of equipment declared idle for an idle piece already in the Reserve). Each model represents a total system cost approach to making the respective decision. Principle elements of each are one-time costs, recurring costs, demand probabilities, technical value, response time to customer, level of activity anticipated in mobilization situations, and methods of disposal.

80-01. Analysis of a Proposal to Reduce Out-of-Area Shipments (January 1980)

This report describes the analysis of a proposal to reduce out-of-area shipments in DLA by changing the backorder release policy. The computer simulation model used to test the proposal is documented and results and conclusions are provided.

79-04. A Report on Defense Logistics Agency Cost to Manage Items in the
Commercial Item Support Program (CISP) - Volumes I and II
(December 1979)

This study report documents an analysis which examined the Total Support Cost (TSC) for managing an item of supply under several alternative methods. The study emanated from a request of the Assistant Secretary of Defense (Manpower, Reserve Affairs and Logistics) that DLA develop a plan for implementing a Commercial Item Support Program (CISP). A part of that plan required mathematical formulas and costing procedures to compare the TSC of the various possible alternatives.

79-03. DLA Manpower Planning Model Analysis and Applications (May 1979)

The DLA Manpower Planning Model simulates personnel losses and acquisitions over a specified time frame and estimates training program recruitment needs. Originally developed for the DLA Quality Assurance work force, the model was expanded to include ten professional career groups in DLA. This report describes and documents the expanded model and includes both short- and long-term projections concerning the future of the work force studied.

79-02. Economic Analysis of the Phase-Out of the Navy Men's Service Dress Blue Coat

This study examined the cost/savings to the Government in phasing out the Navy Men's Service Dress Blue Coat. The economics of issuing the new jumper-style uniform were not considered, since the Navy had decided to stop issuing the coats independent of the jumper. The study indicated that it was most economical to stop issuing the coats immediately.

79-01. Economic Analysis of the Realignment of Clothing Stockage and Distribution at the Recruit Induction Centers (January 1979); Addendum (January 1979)

This study examined the economic feasibility of relocating the storage and distribution mission for monetary clothing allowance items from the DLA depots to the Military Services' Recruit Induction Centers (RICs). Six alternatives were identified. In all of these alternatives, the RICs along with Norfolk and Oakland Navy depots served as wholesale depots for the monetary clothing allowance items with DLA owning the wholesale stocks. The primary differences in the alternatives were: who owns the stocks at the RIC retail issue points, who operates the wholesale depots, and when RIC requisitions were posted at the Defense Personnel Support Center (DPSC). The basic approach of the analysis was to compare the costs and benefits of each of the proposed alternatives with the current system. An addendum to this analysis examined as a seventh alternative the realignment of clothing stockage at Lackland Air Force Base, only.

78-08. Defense Intransit Item Visibility System (DIIVS) Functional System Concept (October 1978)

This document defined an operational concept for the DIIVS which is a proposed DoD logistics information system whose main purpose is to provide timely and accurate information on the identity, status, and location of DoD supply items or shipments in the logistics pipeline. DIIVS is also proposed to be used to modify progress of materiel or shipments within the pipeline through cancellation, diversion, and expediting actions. Systems users will include customers, logistics managers, and operational commanders at all levels.

78-07. Analysis of Alternative Effective Date of Supply for the New Man's Army Black Raincoat With Liner (AB-385) (April 1978), Supplement May 1978

This study examined the net economic cost to the Government for two effective dates of supply (EDOs) for a new man's Army black raincoat with liner. The two EDOs were 1 October 1979 and 1 November 1980. The supplement examined changes in the basic data and assumptions of the April 1978 study. In addition to the

two EDOs examined in the original study, six additional EDOs were examined, the overall effect being determined from an economic viewpoint the optimum EDOs. The supplement concluded the optimum EDO to be in the February-March 1980 time period.

78-06. An Improved Readiness Reporting System (May 1978)

This study identified possible improvements in the way that DLA assesses and reports its readiness to support the Armed Forces of the United States in peace and in war. The study recommended a two-phased effort. The first was aimed at making the DLA readiness reporting system parallel to (and compatible with) the systems now being used by other branches of the DoD. The second effort was aimed at developing the capability of DLA to increase the accuracy of its assessment of capability and to answer such questions as: How would the organization in its present condition respond to different demands on it? How would a change in the organization cause it to react differently to demands made on it?

78-05. Economic Retention/Returns Limits Study (April 1978)

The purpose of this study was to determine DLA's economic retention limits and economic returns limits. It addressed two related problems: determining an upper limit for economic retention and determining both upper and lower limits for economic return quantities. These both are approached using the cost models developed in "Economic Retention/Returns Limits Working Memorandum," August 1977, (77-04).

78-04. An Analysis of Consolidating the Distribution of DESC-Managed Items at Dayton, Ohio (March 1978)

This study added an additional consolidation alternative to the August 1977 study, "An Analysis of the Electronic Distribution Mission at Dayton, Ohio," (Revised December 1977) (77-07). This added alternative Defense Depot Odgen, Utah, the Norfolk Naval Supply Center, the Oakland Naval Supply Center, and the New Cumberland Army Depot. This study documented the one-time and recurring cost increase or decrease expected to result from consolidating the distribution of all DESC-managed items at Dayton, Ohio.

78-03. Split Shipment Costs of the Electronics Commodity (March 1978)

This study examined the cost when a contract calls for the delivery of the same item to two or more activities with the same delivery date. It was an outgrowth of the study, "An Analysis of the Electronics Distribution Depot Mission at Dayton, Ohio," August 1977, Revised: December 1977 (77-07). Questionnaires were sent to firms holding contracts with DESC. Analysis of the data gathered indicated a split shipment cost was \$4.83 for each added destination per contract item.

78-02. DLAM 7041.1, Economic Analysis Manual (March 1978)

The manual provides basic guidance for conducting and reviewing economic analyses. It provides the tools needed to evaluate alternatives for ease of project comparison. It is written in an easy to understand fashion, explaining

in detail the techniques required in the preparation of an economic analysis. The approach throughout the manual assumes the reader is a novice in the field of cost/benefit analysis.

78-01. DLA Manpower Planning Model (January 1978)

This report provided documentation, description, and sample output of a simulation model developed for medium- and long-range personnel planning. Using historically-based statistics, the model simulates personnel losses through one year and reports annual losses, trainee input, and statistics such as average age, medium age, etc. The model was designed for the DLA Quality Assurance work force and its recruitment programs; it can readily be modified for application to other career fields.

77-07. An Analysis of the Electronic Distribution Depot Mission at Dayton, Ohio (August 1977), (Revised: December 1977)

The report examined the feasibility of relocating the DLA depot mission at Dayton, Ohio, to other DLA and DoD Depots. It also examined the feasibility of consolidating the DLA electronics mission at Dayton, Ohio. A computerized linear programming model was used to assign workload to the potential recipients on the basis of inbound and outbound transportation costs. Feasible alternatives were selected from the set of alternatives used in the model and the costs and savings associated with each alternative computed and compared. Conclusions were developed by comparing the results of the cost analysis with certain unquantified considerations and indicated it was economically and operationally feasible to relocate the Dayton Depot to other DLA and DoD Depots.

77-06. Economic Analysis for the Standard Automated Portion of the Technical Information Storage and Control System (TISCS) (November 1977)

This study evaluated the standard automated portion of the proposed Technical Information Storage and Control System (TISCS). This system would control the storage, retrieval, requesting, acquisition, and dissemination of engineering drawings at the DCSC, DESC, DGSC, and DISC Technical Data Management Offices. The study examined four alternatives: (1) a baseline, which grafts evolutionary development of a cross-referenced drawing index onto the current operating mode; (2) a self-contained TISCS, which would automate the cross-referenced drawing index and the batch processing of internal and external technical data requests; (3) a TISCS having a mechanical interface with the DLA Standard Automated Materiel Management System (SAMMS) and the Defense Integrated Data System (DIDS) Total Item Record (TIR), with batch processing of technical data requests as in Alternative 2; and (4) a TISCS, linked to SAMMS and the DIDS TIR, which would process technical data requests in an on-line mode.

77-05. BOSS/RIMSTOP Stockage Policy Simulation Comparison Analysis (August 1977)

This study documented a comparison analysis of the DLA Base Operating Supply System (BOSS) stockage policy to the proposed Retail Inventory Management and Stockage Policy (RIMSTOP). A computer simulation model using cost and performance statistics was employed for the comparison. Four performance measures were used to compare the RIMSTOP stockage policy and the BOSS stockage policy.

77-04. Economic Retention/Returns Limits Working Memorandum (August 1977)

The DLA has been using an arbitrary limit of six years stock, measured at the current demand rate, as the upper limit on the quantity of stock to be held in inventory for most items of supply. The "Economic Retention/Returns Limit Study," July 1971 (O-71-03), offered an analytic model of economic retention which did not consider the risk properties of the economic retention problem. This report attempts to correct this deficiency through the use of some theoretical work on demand probabilities. This effort explores the probability that a given amount of stock will be demanded and when it will be demanded in a theoretical vein. It attempts to weigh the relative costs of holding the stock versus disposal and possible repurchase.

77-03. Provisioning Item Demand Study (March 1977)

This study examined the conditional probability of experiencing no demand for a new provisioning item during the first two years of the item's life, given an initial estimate of demand frequency. The study produced a conditional probability table to be used as part of the input to new item stockage criteria determinations. The study concluded there was no correlation between forecasted demands and the probability of receiving no demand and recommended that DLA implement the new item stockage criteria with a constant.

77-02. DLA Resources vs. Supply Availability (March 1977)

This study documented a method for assessing the impact of inventory management policy changes on DSA Supply Center (DSC) costs (both stock fund and O&M) and performance in order to provide inventory managers with another tool for making trade-offs between resources and performance. This analysis, based on Defense Construction Supply Center data, examined the relationships between changes in inventory management performance and corresponding changes in costs under various Standard Automated Materiel Management System (SAMMS) management policies. The analysis used the Uniform SAMMS Inventory Management Simulation (USIMS) model and simulated demand based on data submitted quarterly by the DSCs. It accepted similar input policies and provided the same output results as SAMMS. The relationships between costs and performance, resulting from the simulation of SAMMS policies were established through the use of regression techniques.

77-01. Economic Analysis of the Relocation of DFSC to DGSC (February 1977)

This study examined the economics of moving the Defense Fuel Supply Center (DFSC) to the Defense General Supply Center (DGSC). DFSC currently used part of building 8 at Cameron Station. The alternative location at DGSC would require a new building. This report is an adjunct to the "Economic Analysis of Administrative Space for Defense Documentation Center and Defense Fuel Supply Center," prepared November 1976 and revised January 1977 (76-11). The analysis indicated that it would be less costly for DFSC to remain on Cameron Station than to move.

76-11. Economic Analysis of Administrative Space for Defense Documentation Center (DDC) and Defense Fuel Supply Center (DFSC) (November 1976), (Revised: January 1977)

This study examined the economics of alternative locations for providing administrative space for two DLA activities that are susceptible to moving out of the National Capital Region: DDC and DFSC. Seven locations outside were examined: Aberdeen Proving Ground, MD; Fort Monmouth, NJ; Fort Dix, NJ; Frankfort Arsenal, Philadelphia, PA; Marine Corps Supply Activity; Philadelphia, PA; Naval Construction Battalion Center, Davisville, RI; and Air Force Plant 6, Marietta, GA. These sites were nominated by the Military Services as having space available for DDC and DFSC. It was concluded that the least cost solution was to remain at Cameron Station.

76-10. Pre-Test Economic Analysis of the Defense Intransit Item Visibility System (DIIVS) (December 1976)

This analysis examined order-of-magnitude life-cycle costs and identified DIIVS' potential benefits. It provided information for use in the decision-making process to proceed with the DIIVS Prototype Test. A series of six configuration options were addressed and included integrating the DIIVS automated data processing equipment (ADPE) with the Defense Automatic Addressing System (DAAS) ADPE.

76-09. Contract Compliance Automated Management Information System (AMIS) (November 1976)

This study was undertaken to determine the economic feasibility of implementing Phase II of the Contract Compliance Automated Management Information System (AMIS). Phase II was to provide local reporting capability at the Defense Contract Administration Services Region level. Life cycle costs of the current system (Phase I) and the proposed system (Phase II) were examined and the alternatives compared on the basis of their Net Present Values. A break-even analysis was performed and revealed that Phase II would become cost advantageous during FY 1978. Intangible benefits are also discussed in the report.

76-08. Cost Analysis of DoD Standard Warehousing and Shipping Automated System (DADS) (September 1976)

The purpose of the study was to compare the costs of developing and maintaining an advanced design warehouse and shipping automated system for DoD Depots with the status quo of each Service/Agency having its own design agency. DADS would be capable of operating at any DoD Depot regardless of the operating Service/Agency. It was concluded that the cumulative discounted costs of DADS development and maintenance would exceed that of the current environment.

76-07. Effects of Changes in IPG II Response Time on DoD Logistics Costs (September 1976)

This study analyzed the impacts of changes in the mode of shipment for Issue Priority Group (IPG) II shipments. The change in total average response time was calculated for the current distribution system, and the effects of the change on customer inventory levels were estimated. Dollar values of effects were estimated when possible.

76-06. Program Evaluation of the Storage and Transportation Quality Control Program (September 1976)

The Storage and Transportation Quality Control Program was examined to determine if the current level of effort should be continued or altered. Data from two depots, DDMP and DGSC, were analyzed. The sampling plans, frequency of sampling, number of customer complaints, and percentage of materiel release order denials were examined. The following recommendations were given in the study: A single sampling plan for MILSTD 105D should be used in place of the current sampling procedures. The functions should be examined every other month instead of monthly.

76-05. Five/Six Day Depot Workweek (August 1976)

This study examined the potential resource savings and the impacts upon DoD Force Readiness if DSA depots are closed on weekends and holidays. Eight alternatives were examined ranging from current policy to complete closure of depots on Saturday, Sunday, and holidays. In order to determine the true impact of on-time fill, a study of changes in delivery time to the requisitioner was made. It was determined that potential savings could be achieved by closing DSA depots on weekends.

76-04. A Generalized Budget Model for Inventory Management (June 1976)

A research paper presented to the U.S. Naval War College.

This research employed the DoD safety level model, together with an analysis of the DSA item population, to determine implied backorder costs in terms of summary data readily available to top management. Investment/responsiveness trade-offs were explicitly examined for four DSA Supply Centers. Results were then used to formulate a method of economic analysis to be applied to new programs. Finally, these results were coupled with forecasting efforts to suggest an integrated budgeting model for use by top management.

76-03. Economic Analysis of Administrative Space for HQ DSA, DDC, and DFSC (February 1976); Addendum (June 1976)

This study examined alternative means for DSA to obtain administrative space for its activities located on Cameron Station, Alexandria, Virginia. The study was divided into two parts; one part dealt with the Defense Documentation Center (DDC) and the Defense Fuel Supply Center (DFSC) and the other part dealt with HQ DSA. The alternatives examined were: (1) repairs to current facilities, (2) move to leased space in National Capital Region (NCR), (3) move to new Government facility in the NCR, and (4) for DDC and DFSC exclusively, move to Government facility outside the NCR. Present value analysis techniques were used in comparing the alternatives. The addendum contained the analysis of two additional alternatives: Repair of buildings 3 and 4 at Cameron Station and the erection of a new building at Cameron Station. These two alternatives were variations of two alternatives contained in the main report.

76-02. Procurement Workload Leveling Study (March 1976)

This report documents the results of simulation analysis of alternative methods of leveling out the workload pattern in the DSA Supply Center (DSC) Procurement Directorates. The frequency of arrivals of procurement requests is influenced by the frequency of reorder point (RP) checks in the requirements subsystem. Since the majority of DSA-managed items experience their quarterly forecast of demands update (and subsequent recomputation of the RP) at the end of each quarter, there is a quarterly surge in the number of RP checks, which triggers a surge in the number of RP breaches and a similar surge in the number of RPs generated. The study compared six alternatives under two measures of effectiveness. In addition to determining the most desirable technique, the study also demonstrated that workload leveling results in a decrease in administrative leadtime, allowing a reduction of safety level, for quantifiable investment savings.

76-01. Economic Analysis of MOCAS/DBMS (February 1976)

This study updated a previous economic analysis on the MOCAS/DBMS potential upgrade (performed by the Systems Division of DSA). The earlier study indicated that possible improvement could be made to the system at approximately the same cost as the current system. The updated economic analysis was conducted after additional testing. Five alternatives were examined. The analysis concluded that the least cost alternative would be approximately one million dollars less than the current tape system.

75-14. Economic Analysis of Centralized Forms Storage Facility (October 1975)

DSA policy calls for centralized (within DASC) procurement/funding of selected DSA/DD forms. This analysis examined the economic feasibility of establishing a central forms storage point. One-time costs were not included. Only additional costs and benefits associated with operating a central storage point were examined to determine if savings could be realized on a recurring basis.

75-13. An Economic Decision Model for Item Stockage (September 1975)

This report summarizes the research and conclusions on the use of an economic decision model to determine if an item should be stocked or purchased on a requisition basis. A decision formula was developed in terms of the average variable cost of stockage versus the cost of nonstockage. Cost elements were determined on a commodity basis. A set of requisition frequency tables are included in the report which permit the commodity manager to quickly determine if a given item should be stocked, based on its production leadtime and annual demand value. The frequency tables were derived within the model through the comparison of projected two-year stockage costs to two-year nonstockage costs. In addition, the model used a disposal penalty term, which measures the tendency of the system to generate excess stocks for low frequency items. Losses for low frequency items were treated explicitly, rather than through the average obsolescence rate as a component of the holding rate.

75-12. Loss of Shipment Consolidation Due to UMMIPS Time Standards
(September 1975)

The Uniform Materiel Movement and Issue Priority System (UMMIPS) was designed to provide a measurement of supply and transportation performance against time standards. Time standards were developed for each phase of the supply cycle. This study analyzed freight consolidation from the viewpoint of lifting the constraints of these time standards.

75-11. DICOMSS Mechanization at Defense Depot Mechanicsburg, Pennsylvania
(DDMP) (August 1975)

This study examined three alternatives for materiel handling systems to accomodate the DSA Direct Commissary Support System (DICOMSS) at DDMP. The first alternative was a manual break-bulk and van-loading system. The second alternative was a totally mechanized version of the first, and the third alternative was a partially mechanized version which also pre-stages van loads upon receipt of materiel. The systems were simulated to test feasibility and compared using standard economic analysis techniques.

75-10. Economic Analysis of the Expansion of Standard Automated Materiel
Management System Teleprocessing (SMMSTEL) (August 1975)

The expansion of Standard Automated Materiel Management System Teleprocessing (SMMSTEL) is a means to enhance SAMMS processes through the maximum practical use of automatic data processing (ADP) and teleprocessing equipment and techniques. SMMSTEL is basically concerned with the Functional Managers' interface with the SAMMS ADP. The SMMSTEL project was divided into two phases. Phase I was mainly concerned with requirements from the Directorate of Procurement and Production and the Office of the Comptroller. Phase II was mainly concerned with requirements from the Directorate of Supply Operations, the Directorate of Procurement and Production, and the Directorate of Technical and Logistics Services. The study examined the cost and benefits of both phases of SMMSTEL, both separately and jointly.

75-09. Determination of Resource Savings If Stock Availability Goals Are
Lowered (August 1975)

As the study "Determination of DSA Resource Savings If Stock Availability Goals are Lowered for Defense Electronics Supply Center (DESC)," April 1975 75-05), applied only to DESC, an expanded study of the four hardware Centers (DCSC, DESC, DGSC, and DISC) has been summarized in this report. The report provided the aggregate of resource savings, increased costs, and performance measures that result from the implementation of the FY 1975 budgetary constraints in the Uniform SAMMS Inventory Management Simulation (USIMS) model. Basically, the budgetary constraints decrease the procurement cycle quantity and reduce or eliminate the safety level requirement. The order quantities are reduced while the frequency of ordering is increased. The simulation projected a one-time savings in average stock on hand of approximately \$145 million for FY 1976 with the FY 1975 budgetary constraints in effect.

75-08. NSC San Diego Transportation Study (August 1975)

This study analyzed the impact in terms of transportation costs and space requirements of supporting Naval Supply Center (NSC) San Diego directly from procurement sources rather than through Defense Depots Ogden, Utah (DDOU) and Tracy, California, (DDTC). Storage and workload impacts were estimated for all three locations; however, the possibility of commodity realignment due to loss of workload at DDOU and DDTC was not investigated.

75-07. Accounting for Inflation in DoD Economic Analyses (June 1975)

A research paper presented to the Industrial College of the Armed Forces.

The intent of this project was to provide DoD economic analysts with some pragmatic guidance on how to treat inflation in making analyses. Attempts were made to enhance the technique of economic analyses by: showing the effect of inflation on the outcome of economic analyses; exposing the problems encountered in measuring and forecasting inflation; and, proposing a practical methodology for treating inflation in economic analyses.

75-06. Economic Analysis of the Defense Fuel Automated Management System II (DFAMS II) (June 1975) (Revised February 1979)

This study examined and compared the cost of the current Defense Fuels Automated Management System (DFAMS I) and the costs and benefits of the proposed DFAMS II of the Defense Fuel Supply Center (DFSC) at the conceptual stage of the system development. The proposed concept paper for DFAMS II was used as the base for determining how DFAMS II would operate. Because of a lack of detailed operational knowledge, order of magnitude costing was used in the analysis. The analysis indicated that the annual operating costs for the DFAMS II would be greater than the current operating costs in addition to certain one-time costs associated with the development and implementation of DFAMS II. Also included in the analysis were certain potential unquantified benefits of DFAMS II.

75-05. Determination of DSA Resource Savings If Stock Availability Goals Are Lowered For Defense Electronics Supply Center (DESC) (April 1975)

This study was to determine resource savings as stock availability goals were lowered at DESC when budgetary constraints that limit the procurement cycle quantities and safety level requirements are applied. The study used the Uniform SAMMS Inventory Management Simulation (USIMS) model. An analysis of the results obtained from the USIMS model indicated that for the two simulated years, sizeable savings in obligations can be made by implementing these budgetary constraints at DESC. However, there would result a deterioration in supply performance mainly in high value annual demand items.

75-04. Economic Analysis of Alternative Locations for DCRL and DCASD-LA (March 1975)

This study examined locations for the Defense Contract Administration Services Region, Los Angeles (DCRL) and the Defense Contract Administration Services District, Los Angeles (DCASD-LA). Both activities were required to move due to the substandard conditions of the buildings. Various Government-owned and commercial-leased space were examined. A present value analysis was performed on the alternatives considered.

75-03. Economic Analysis of PURA/MARCE (March 1975)

Material Asset Redistribution Center, Europe (MARCE) and Pacific Utilization and Redistribution Agency (PURA) are programs for the reutilization/redistribution of potential excess assets within theaters. Both operate on an inter- and intra-service basis. The full range of items stocked (DSA, GSA, Military Service-managed) are included in these programs and approximately \$2 million in retail level assets are redistributed monthly. This study was concerned with evaluating the one-time and recurring costs associated with the positioning of the PURA and MARCE programs within the Defense Supply Agency.

75-02. Economic Analysis of Uninterruptible Power Supply (UPS) for Automatic Data Processing (ADP) (February 1975)

This study report contains an Economic Analysis of Uninterruptible Power Supply (UPS) for Automatic Data Processing (ADP) for DESC, DGSC, DISC and DPSC. The UPS serves two roles: as a power line filter and as a temporary power supply. The analyses examined the costs and benefits of UPS. The costs and quantified benefits were discounted and compared. In addition to the quantified benefits, a substantial body of unquantified benefits were examined.

75-01. Uniform SAMMS Inventory Management Simulation (February 1975)

The Uniform SAMMS Inventory Management Simulation (USIMS) model was developed to aid a DSA Supply Center (DSC) Commander in inventory decision-making processes. This model provides the DSCs with the capability to test the input of management policies on the inventory system before the policies are implemented in the real world. The model uses DSC data and item sample sizes deemed large enough to be statistically representative of the item population of the DSC. Run times are dependent upon sample size and the number of years simulated. Defense Supply Agency Manual (DSAM 4140.2) describes in a single source the rationale on which the USIMS project is based, the operation and use of the system including the source and philosophy of various values, and techniques. The manual also contains the system documentation with its applicable flow charts, record layouts, etc.

74-16. A Simulation Study of the Supply System Cost and Effectiveness
Impacts of Anticipated Changes in Production Leadtimes (December 1974)

This report summarizes the impacts of accurate advance knowledge of changing production leadtimes on inventory investment. Economic trade-offs occur in terms of changing holding costs versus backorder costs. It was concluded that updating reorder points six months in advance of a known change in production leadtime can lead to substantial net savings in the high dollar item categories. Realization of these savings appears feasible since only a small population of items requires the management attention necessary to achieve these savings. Perfect accuracy in prediction was assumed.

74-15. Study Report on Bulk Movement of Materiel from Attrition Sites
(December 1974) (Revised May 1975)

This study was undertaken in response to an Assistant Secretary of Defense (Installations and Logistics) request for the formulation of economic criteria to be used in decision-making on bulk movement of materiel from attrition sites. A "break-point" cost equation was formulated to provide a cost

justifiable basis for future decision-making on the transfer of logistically reassigned materiel from the storage facilities of losing item managers to those of gaining item managers. Cost factors in the equation encompass transportation charges, shipping and receiving costs, operating costs and loss of asset visibility and shipment consolidation opportunities. Proposed policy changes resulting from this examination and from the development of the cost function, are also discussed in the report.

74-14. Economic Analysis of a Standard DoD Payroll System (November 1974)

This study, undertaken to assist the Civilian Pay Standardization Group in its analysis of a standard civilian payroll system in DoD, examined three alternatives, including the status quo. Costs for the other alternatives were developed by examining the current system and the degree of standardization required. Present value analysis techniques were used in comparing the alternatives. To examine the difference in life cycle costs among the alternatives, a hypothetical region was examined.

74-13. Quantification of MILCON Project Evaluation, A Recommended Approach (October 1974)

This paper recommends a quantification scheme for evaluating Military Construction (MILCON) projects. It suggests that point values be assigned to each of the following categories: (1) legal requirements, (2) sociological impact, (3) political nature, and (4) economics. Once all projects have been evaluated, they can be prioritized based on their total point value.

74-12. Lease vs. Purchase Analysis for the Bermuda Fuel Support Point (September 1974)

This study was conducted to assist the IPRB in evaluating DFSC's request for Military Construction (MILCON) funds to purchase fuel storage tanks for the Bermuda Fuel Support Point. Two alternatives were examined in the study, leasing of fuel storage tanks (present environment) and purchasing of fuel storage tanks. The short time frame allotted for this study precluded the examination of other alternatives and forced the use of "order of magnitude" estimates in some places. A present analysis was performed using a 10 percent discount rate.

74-11. Economic Analysis of Proposed Mechanization of DDMP D1COMSS (September 1974)

Direct Commissary Support System (D1COMSS) is a DSA-managed program designed to provide Brand Name Resale and Troop issue, or specification subsistence to the Military Services on a worldwide basis. This study analyzed alternative ways of operating D1COMSS considering two alternatives. The first considered operating D1COMSS manually and the second envisaged the mechanization of a renovated warehouse. This analysis compared the discounted life-cycle costs of the two alternatives over a 10-year period.

74-10. Economic Analysis of Item Stockage in Loose Issue Warehouses
(September 1974)

The purpose of this study was to compare costs and benefits of programming and implementing a computerized Loose Issue Item Stockage System. Recurring costs were considered negligible; therefore, only one-time costs were examined. A present value analysis was performed. Cumulative costs and benefits were graphed to determine the break-even point.

74-09. An Evaluation of Alternative Maximum Release Quantity (MRQ) Policy
(Draft: July 1974) (Draft not finalized)

This report compared the maximum release quantity (MRQ) policy of the Standard Automated Materiel Management System (SAMMS) with the policy previously used by the Defense Industrial Supply Center (DISC). The measure of efficiency for each policy was the dollar value of cancellations obtained at a fixed workload. In addition, the efficiency of a third MRQ policy, based on a mathematical model, was measured.

74-08. Economic Analysis of the Automated Pay, Cost and Personnel System
(APCAPS) (July 1974)

This study documented the update of the January 1973 "Economic Analysis APCAPS, Segment I, Phase 2," (73-01). The update included an analysis of various alternatives for providing support for Segment I, Phase 2. Segment I is the Payroll and Labor Cost/Performance System. Phase 2 provided a completely automated cumulative and detailed man-hour and cost (labor and cost other than labor) system to report, analyze, and evaluate all expenses. The two questions addressed in the analysis were the cost-effectiveness of Segment I, Phase 2, and the most economic automated data processing support for APCAPS.

74-07. Economic Analysis of Standard DoD Warehousing and Shipping Automated System (June 1974)

This study, prepared in conjunction with a DoD task group which was developing the concept document for a Standard Warehousing and Shipping Automated System for DoD Depots, examined current operations and the proposed system. Costs for the current systems were obtained from the DoD components. Task group members estimated the cost of the proposed system using a modified Delphi Technique. Three estimates were developed for the proposed system; a high, a best, and a low estimate cost. Present value analysis techniques were used to compare the two alternatives.

74-06. Procurement Administrative Leadtime Study (May 1974)

This is a simulation study report of Procurement Administrative Leadtime (PALT). The first portion of the report deals with the development and utilization of a queuing model to simulate the procurement system. The results derived from this simulation are concerned with analyses of PALT by method of procurement, of PALT composition by functional status, and of the impact of buying effort on PALT. The second portion of the study report outlines the short- and long-term effects on an inventory system resulting from a changing PALT. The recommendations of this study were implemented by DSA.

74-05. Economic Returns Formula for Unserviceable Reparable Items in the
Defense Supply Agency (April 1974)

This study is an extension to the Economic Retention/Returns Limits Study (71-03); it compared the benefits disposing unserviceable reparable materiel to the benefits of returning and repairing the material for future issue. The analysis was made on strictly economic terms: the principle of marginal utility was used to determine the break-even point between return, repair, and retention versus local disposal. In addition to the usual cost considerations, the concept of a "discard rate" was introduced as a percentage of unserviceable materiel returned but found not to be reparable. The formula was implemented by DSAM 4151.1.

74-04. Study of Alternative Depot Receipt Confirmation Procedures
(April 1974)

This simulation study examined the effect of early notification of material receipt to an Inventory Control Point, and the effect of prepositioning of backorders within the receipt area of a depot, upon inventory investment, and performance. The study report shows that early notification can affect either investment or performance, and that prepositioning of backorders affects only performance. This study was performed for the Logistics System Policy Committee Task Group 4-73, and incorporated into their report, DoD Standard Warehousing and Shipping Automated System.

74-03. Project "P.O.L.": Optimizing Procurement of Aviation Fuels for
Defense Supply Agency Network Generating Algorithm (January 1974)

Study performed by the U.S. Air Force Academy.

This paper describes a program which reads input data designed for a transportation model linear program, previously used by the Defense Fuel Supply Center to award contracts for the procurement of aviation fuels. The data is restructured into a network formulation. A collection of nodes represent oil companies, Government storage terminals, and military installations; arcs represent the transportation net connecting these locations. Care is taken to properly represent product offerings which have optional F.O.B. locations, delivery points, transportation methods, and quantities. The output is the precise network description required by the optimization algorithm described in the other report from Project "P.O.L." (Petroleum, Oil, and Lubricants).

74-02. Project "P.O.L.": Optimizing Procurement of Aviation Fuels for
Defense Supply Agency (January 1974)

Study performed by the U.S. Air Force Academy.

Department of Defense requirements for aviation fuels are met with purchases in the usual competitive bidding environment. This large-scale contract bidding and selection problem was modeled as a mixed-integer linear program with a special structure. The solution of this large optimization problem is approached via an algorithm employing decomposition and implicit enumeration techniques which exploit the special structure of the underlying formulation. This formulation improves upon the linear program previously used, through shorter execution times, and internal handling of bids with minimum acceptable quantities. The program was implemented by the Defense Fuel Supply Center.

74-01. Bases for Project Evaluation (January 1974)

This paper defined and discussed six dimensions for analyzing the desirability of projects or actions. These dimensions were arranged along a continuum with regard to time and threat. No specific recommendations for project evaluation were made.

73-10. MOCAS: Lessons Learned (July 1973)

See abstract 73-04.

73-09. Standard Automated Materiel Management System (SAMMS): System Development and Implementation Problems (July 1973)

See abstract 73-04.

73-08. MOWASP: Lessons Learned (July 1973)

See abstract 73-04.

73-07. Study of Systems Development/Implementation Problems and Lessons Learned: Automated Pay, Cost and Personnel System (July 1973)

See abstract 73-04.

73-06. Lessons Learned: Defense Integrated Data System (July 1973)

See abstract 73-04.

73-05. System Development Survey: Defense Automatic Addressing System (July 1973)

See abstract 73-04.

73-04. ADP Management in the Defense Supply Agency (July 1973)

The purpose of this study was to analyze DSA's experience in the development of computer systems and to make recommendations on how best to manage automatic data processing systems in the Defense Supply Agency in light of current and near future requirements. The study was divided into three distinct but interrelated parts. Part I evaluated system development practices and recommended appropriate actions for the management of future systems development and implementation. Part II developed techniques and methods for measuring the performance, appraising the results, and controlling the costs of ADP and data communications. Part III focused on how best to organize for overall management to computer supported systems development and operation. Evaluation of systems development practices included a synthesis of reports (73-05 through 73-10) on six major ADP-supported systems that were studied.

- 73-03. Economic Analysis of Tailored Management Data Lists (MDLs) and Consolidated Catalog Management Data Notifications (CMDNs) vs. Consolidated Catalog Management Data Notifications (CMDNs) (July 1973)

The purpose of the study was to perform a cost comparison of publishing and distributing, under DIDS, of (1) the Service-tailored MDLs and the consolidated CMDN Listing, or (2) the Consolidated CMDN Listing only. Both the tailored MDLs and the Consolidated CMDN Listing contain item management data elements, such as Federal Stock Number, unit of issue, unit price, and source of supply. Additionally, the CMDN Listing contains Inventory Manager data that the MDLs do not. The study concluded that the annual costs of publishing only the CMDN Listings exceed the costs of publishing the CMDN Listings and the Service-tailored MDLs.

- 73-02. Report of Simulation Analysis of Alternative Variance of Demand Estimators (February 1973)

Variance of demand estimators serve many operations research functions. They are used in safety level computations and simulation demand generators; they are input to develop estimates of dollar inventories, workloads, and staffing patterns. This study examined four estimators and compared their effectiveness in terms of backorders on file, the preferred performance measure of the Defense Supply Agency. The method of comparison was through modification of the inventory simulation of the Defense General Supply Center (DGSC) to include each of the four estimators, in turn. A sample of 427 DGSC items were then input to the simulation, and the results compared. A power function derived through regression analysis by the Air Force shows a four percent reduction in backorders over Standard Automated Materiel Management System procedures.

- 73-01. Economic Analysis of APCAPS, Segment I, Phase 2 (January 1973)

See abstract 71-01.

- 72-13. Cost Comparison of Alternate Facilities for Defense Fuel Supply Center (DFSC) (October 1972)

This study compared the costs of various alternatives for locating DFSC at Defense General Supply Center (DGSC), or in the Richmond, Virginia, area. Only the Richmond area was considered as the alternate geographical area for the DFSC's location versus the present location at Cameron Station, Alexandria, Virginia. The three alternatives considered were: (1) construction of a multi-story building at DGSC, (2) renovation of a warehouse at DGSC, and (3) utilization of leased space in the Richmond area.

- 72-12. Analysis of Alternative Control Levels for Materiel Management Systems (October 1972)

A control level is a device which affords extra protection (over that given by normal operating and safety levels) for high-priority requisitions in a supply system. When stock on hand is at or below the control level, issues are made only for high-priority requisitions; any low-priority requisitions received are placed on backorder pending receipt of replacement stock. The study used the SIMSCRIPT simulation model of a generalized Defense Supply Center with a

sample of 100 items. Two methods of computing a double control level were compared. The double control level sets one level below which only Issue Priority Group (IPG) I requisitions are filled, and another below which only IPG I and IPG II requisitions are filled. The first method computes the control levels as a constant fraction of the quarterly forecast of demand. The second method computes control levels as a fraction of forecasted demand for the remainder of the procurement cycle; thus they decrease from a maximum value assigned immediately after a receipt. The two methods were referred to as constant and decreasing control levels, respectively. The use of decreasing control levels was recommended.

72-11. Evaluation of a Proposed Information Reporting Requirement (PIRR)
Within the DSA Management Information System (MIS): A Suggested
Approach (October 1972)

A generalized decision theory model was developed to analyze the cost/effectiveness of a PIRR. Benefits were measured by a variety of methods. Cost estimates were in dollars. These inputs were analyzed by a remote terminal computer program and a cost/benefit analysis was performed. Based on the results of the cost/benefit analysis, a cost/effectiveness analysis may then be performed which converts the net return of the cost/benefit analysis to a common utility scale. An effectiveness index may then be computed.

72-10. A Comparison of Alternate Computations for Mean Absolute Deviations
of Forecast Errors (DRAFT: August 1972) (Draft not finalized)

The study was to determine the "better" method of computing mean absolute deviation (MAD) of forecast errors between two different approaches. The term "better" referred to an improvement in line item availability at constant inventory cost. In the Standard Automated Materiel Management System (SAMMS), single exponential smoothing is used to compute the MAD of forecast errors. An alternate method of computing the MAD whereby only underforecasted errors were used was proposed. These two methods were compared using a simulation technique. Separate sets of computer simulation runs were made using each computational method, and each set was compared with the other using system effectiveness (stock availability versus inventory investment) as a measure to determine the "better" method.

72-09. Derivation of Operating, Supplies and Materials, and Overhead Cost
Factors (August 1972)

This study derived from historical data three factors (operating, supplies and materials, and overhead) which could be used in forecasting costs in the functional areas of the five DSA supply centers (DPSC, DGSC, DISC, DCSC, and DESC) and of the four DSA depots (DDMP, DDOU, DDTTC, and DDMT). The factors were expressed in units of overhead cost per direct personnel cost.

72-08. Economic Analysis of Telecommunications Support for the DAAS
(July 1972)

The purpose of this analysis was to determine the most economical combination of telecommunications and data processing equipment to be used in upgrading the Defense Automatic Addressing System (DAAS) at Gentile AFS, Dayton, Ohio,

and Defense Depot Tracy, California (DDTC). The analysis also considered the most economical method for providing telecommunications support for activities other than the DAAS which are located at Gentile and DDTC.

72-07. Economic Analysis of MODISCO (July 1972)

This study report is an economic analysis of a proposal to fully mechanize the operations of the Defense Industrial Security Clearance Office (DISCO). Seven alternative methods of accomplishing the DISCO operations were examined. The present manual system was used as a baseline alternative against which the others were compared. Life cycle and uniform annual costs for all alternatives were examined over an eight-year period and a present value analysis was performed. Key variables affecting the costs of each alternative were then tested for sensitivity to change.

72-06. HQ DSA Guidance for Implementation of Time-Weighted Essentiality-Weighted Requisitions Short Variable Safety Level (July 1972)

This paper provides Defense Supply Agency documentation, references, mathematical derivation, supporting data, and guidance for ADP implementation of economic order quantity and time-weighted, essentiality-weighted, requisitions short variable safety level prescribed by DoD Instruction 4140.39, dated 17 July 1970. The concept of the DoDI is to minimize not only the number of requisitions which are placed on backorder, but also the time on backorder. However, the DoDI does not go beyond specifying the general mathematical model. This report interprets the DoD concept, provides the specific probability distributions, and furnishes step-by-step instructions suitable for development of automated data processing specifications. The formulas have been implemented throughout DSA.

72-05. Economic Analysis of Defense Integrated Data System (DIDS) (June 1972)

This study was an economic analysis of the Defense Integrated Data System (DIDS). The costs of developing and implementing DIDS at the Defense Logistics Services Center (DLSC) and in the Military Services, Defense Agencies, and other Federal Agencies were examined. Changes in operating costs at DLSC after DIDS implementation were also examined as was the impact of DIDS on the operations of the Services and Agencies. An update to this analysis was prepared in March 1973 to examine the added costs and reduced savings resulting from a delay in DIDS implementation.

72-04. Storage Medium Problems in Operations Research Office (June 1972)

This study evaluated alternative media for the retrieval of operations research simulation output data. Three alternatives were considered: (1) hard copy; (2) microform; and (3) tape. The problem areas evaluated in the analysis were speed, convenience and cost. To determine the least costly method, the net present value for each alternative was computed.

72-03. Economic Analysis of MOWASP II (May 1972)

This study was performed to explore the economic feasibility of installing new automated data processing equipment (ADPE) at the seven DSA depots for servicing MOWASP 74, APCAPS, DAMS, WPC, and BOS. The alternative considered

was to manually perform all operations of these systems that could not be performed by the present ADPE. This study examined the life-cycle costs of the ADPE and the Depot's system which it supports at the seven DSA Depots, with and without MOWASP II. Alternatives were compared on the basis of their Net Present Value. The analysis was also tested for its sensitivity to variations in the most significant costs elements. A break-even analysis was performed to determine when the proposed system would become cost advantageous.

72-02. Forecasting Sales of the Defense Supply Agency (April 1972)

Air War College Professional Study.

This research was undertaken to construct a mathematical model to predict DSA sales to the Military Departments. The technique used was multiple linear regression analysis. Four variables were studied to explain variations in sales. Data were computer analyzed, and high correlation was found between the dependent and the explanatory variables; one variable was found nonsignificant and was discarded. A prediction model was selected. When applying the model and high confidence is sought, wide prediction intervals result, thereby reducing the reliability of the model as a predictor. However, the model was found reasonably accurate when sales estimates were predicted and then compared with actual sales. Several suggestions for improving the model's reliability are offered.

72-01. Determination of the Most Economical Meeting Site (MEMS) (March 1972)

The purpose of this study was to provide the economic justification for choosing a meeting place for representatives of any or all the 26 DSA activities. Travel and per diem costs associated with meeting at each activity were analyzed. A sensitivity analysis was performed to determine the impacts of changes in computation of transportation costs and duration of the meeting. A follow-up to this study, "Computerized Routine for Determination of the Most Economical Meeting Site," provided a program written in conversational mode and stored in BASIC language under the code name "MEMS." The program calculates transportation costs and per diem expenses associated with holding a proposed meeting at each of the 26 activities. The variables involved in calculating the costs are: (a) the activities which are being represented; (b) the number of representatives from each of the activities attending; and (c) the length of the proposed meeting. Instructions for using "MEMS" are included along with the original program listing and a sample run.

71-07. Economic Analysis of DDOU Post Restaurant Operations (1971)

This study is an economic analysis of a proposed upgrading of the restaurant operations at Defense Depot Ogden, Utah (DDOU). The objective of the proposal was to provide an acceptable quality restaurant service that (1) makes a four percent net profit, (2) is reasonably priced, and (3) contributes to the recruitment and retention of the civilian workforce. Five alternative facility configurations (including the status quo) designed to meet these objectives were evaluated. Methods of evaluation included: (a) net present value, (b) number of customers, (c) percent net profits, (d) number of customers per dollar cost, (e) profit per dollar cost, and (f) intangibles such as food quality, convenience, and atmosphere.

71-06. Report of HQ DSA Simulation of Alternative Safety Level Formulations for SAMMS (December 1971)

This report summarizes the results of a simulation study of four different safety level procedures for the DSA Standard Automated Materiel Management System (SAMMS). They are: (1) Service Function, (2) DISC Efficient Surface Model, (3) the DoD Safety Level (time-weighted, essentiality-weighted requisitions short), and (4) fixed safety level. Performance versus cost comparisons were made using three different measures of supply performance in the SIMSCRIPT simulation program of a generalized Defense Supply Center. It was concluded that the DoD safety level is superior; these results were supported by a separate simulation using a sample of 415 Defense Electronics Supply Center items. The recommendation, to use the DoD safety level within SAMMS, was implemented.

71-05. Cost/Benefit Analysis of Potentials for Real-time High Priority Requisition Processing in DSA's SAMMS II (December 1971)

This report contains estimates of potential costs and benefits accruing from implementation of a real-time processing system for high priority requisitions at Defense Supply Centers (DSCs). It applies to an expanded automated data processing equipment (ADPE) system designated as SAMMS II. The results are highly dependent upon the interface between the DSC and the Depot ADPE. Costs were expressed as one-time and recurring marginal costs, in terms of present worth only. Benefits were measured in terms of the number of high-priority requisitions arriving at DSA depots 24 hours earlier, and the corresponding increase in on-time fill.

71-04. Economic Analysis of SAMMS II (August 1971)

This study was conducted to determine the economic feasibility of implementing, with latest automatic data processing equipment, the Defense Supply Agency (DSA) Standard Automated Materiel Management System (SAMMS) throughout the Agency. The purpose of SAMMS is to provide an integrated materiel management system DSA-wide which will encompass the areas of Distribution, Requirements, Procurement, Financial, Cataloging, and Provisioning Activities carried out by the DSA Supply Centers. Plans to install improved equipment at DCSC where SAMMS I was already in operation are included in the study.

71-03. Economic Retention/Returns Limits Study (July 1971)

A major concern of wholesale inventory managers is that, as an item approaches the end of its life cycle, it tends to become overstocked. Retention and/or return limits are generally established at break-even points between the costs of holding long supply materiel and the net costs of materiel disposal and subsequent purchase. This analytical study developed a mathematical formulation of the problem; a unique feature is the long-range forecast of demand based upon an exponential decay function. Tables are provided in the report which can be used to determine the number of years of stock to be retained, and the number of years of stock to be accepted as returns, given the remaining life and the return on disposal for an item. A simplified version of this formula is being implemented in DSA.

71-02. Requisition/Materiel Release Order (MRO) Processing Schedules Study
(June 1971)

This study analyzed the potential effect on on-time fill for Issue Priority Group (IPG) I and II requisitions by modifying timing and frequency of automated data processing cycles which process requisitions and MROs and DSA Supply Centers (DSCs) and depots. Other system improvements were also examined. Changes in cycle timing provided insignificant improvement for all commodities, except those at Defense Personnel Support Center. However, significant improvements could be made through elimination of waiting time at DSCs prior to transmission of MROs, resequencing the DSC messages to place MROs first, and using priority message precedence for IPG I and IPG II MROs.

71-01. Economic Analysis of APCAPS, Segment II (January 1971)

The Automated Pay, Cost and Personnel System (APCAPS) is designed to computerize the Defense Supply Agency (DSA) payroll accounting, other cost accounting and various repetitive activities carried on in the civilian personnel office. APCAPS is divided into two segments: Payroll and Labor Cost/Performance System (Segment I) and Personnel System (Segment II). These studies explored the costs and associated benefits of each phase of APCAPS.

70-13. Effect of Benefit/Cost Ratio of Secular Delay in Project
Implementation (1970)

The purpose of this project was to develop a generalized narrative model which demonstrated the effect of the passage of time on previously developed benefit/cost ratios when a project is delayed due to funding shortages or other unforeseen events. Definition and approaches were developed and applied to specific cases so that changes in absolute dollar were revealed.

70-12. Cost/Benefit Analysis of the Economic Analysis Office (1970)

This report contains the findings of a cost-benefit study of the Economic Analysis Branch. The costs involved in operating and maintaining this Branch in FY 70 were weighted against the benefits attributed to the office during that year. Two comparisons were made by assigning two different dollar values as benefits of the Economic Analysis Office. In one comparison the benefits consisted of only the hard savings realized. The other comparison treated both hard savings and the potential savings as benefits.

70-11. Inventory Simulation of the Defense General Supply Center
(December 1970)

This simulation, written in the SIMSCRIPT programming language, further developed the principles established in the Nonperishable Subsistence Study (66-01). Based on samples of the items managed at each of the Centers modeled, their primary purpose was to suggest the safety level investment required to support desired availability goals. Current management assumptions on the nature of each commodity, and the inventory decision rules for items with a demand history, were incorporated into the models. The results of these studies were used in setting the safety level constant required for implementation of the Standard Automated Material Management System (SAMMS).

70-10. Economic Analysis of Exporting SAMMS to DGSC (December 1970)

This study was conducted to determine the economic feasibility of extending the Defense Supply Agency (DSA) Standard Automated Materiel Management System (SAMMS) to the Defense General Supply Center (DGSC). SAMMS is DSA's answer to the uniform application of automatic data processing to its materiel management mission. It had already been implemented at the Defense Construction Supply Center, one of five DSA Supply Centers. The study consisted of evaluating costs and benefits data from DGSC and from various staff elements of the DSA Headquarters.

70-09. Economic Analysis of MOCAS II (December 1970)

This study report reflects the results of a benefit/cost analysis of Mechanization of Contract Administration Services (MOCAS II). Cost and benefit data used in this study were furnished by the various HQ DSA and Defense Contract Administration Service (DCAS) staff elements involved in developing and implementing MOCAS II. The study included the implementation of all MOCAS II subsystems in the DCAS activities. Excluded were the costs incurred by or benefits accruing to the DSA Supply Centers or any non-DSA activities as a result of MOCAS II.

70-08. Economic Analysis of APCAPS, Segment 1, Phase 1 (December 1970)

See abstract 71-01.

70-07. Determination of Sample Size and Confidence Level for Purchase Order Sampling (October 1970)

This study report presents a series of sampling plans that can be used by Defense Contract Administration Service (DCAS) personnel in performing Contract Procurement Systems reviews. The sampling plans were designed so that they could be used for both individual strata or the entire universe as an entity. Confidence levels of 75, 80, 85, 90, and 95 percent with a precision of ± 8 percent can be obtained. A simple method of selecting a set of random numbers is included. The problem of combining two or more strata and the determination of the combined precision are also discussed.

70-06. Material Testing Laboratory Consolidation (September 1970)

This study examined a proposal to place the Medical Material Laboratory, the Clothing and Textile Laboratory, and the Defense Subsistence Testing Laboratory under common management and to co-locate the facilities. Several feasible organization plans were defined. Estimates were made of the manpower staffing required and the costs and benefits associated with each of the alternatives.

70-05. Economic Analysis of the Plus Criterion (June 1970); Addendum (August 1970)

The purpose of this study was to establish a dollar level criterion for providing information on assets and requirements for utilization screening through the PLUS Program. The criterion was developed based on the break-even point between the cost of reporting, screening, offering, and transferring

property and the benefits accruing from such a transfer. An addendum to this analysis examined the PLUS criterion further to determine if it should not be different for Types 3 and 4 requirements which were being satisfied.

70-04. Economic Analysis of Canned Ham Procurement (July 1970)

In conducting this study, three aspects of canned ham procurement were examined: (1) A decision model utilizing price forecasting techniques was developed to determine the most appropriate (least cost) production leadtime; (2) An evaluation of seasonal procurement rather than monthly procurement of all canned ham requirements for FY 1969. A sensitivity analysis was conducted using the prices (FY 1963) most unfavorable to the seasonal procurement plan instead of those for FY 1969. The seasonal indices for FY 1963 were selected as being the most unfavorable from the 10-year index in terms of price changes; and (3) A study was made of the types of contracts suitable for procuring perishable subsistence to determine if the cost of procurement would be reduced.

70-03. Economic Analysis of Criteria for Reporting Declared Excess Property for Central Screening (June 1970)

This study evaluated the validity of criteria for reporting declared excess property for centralized screening and provided a basis for establishing reporting criteria which would insure maximum utilization at minimum cost. Costs for both holding and receiving activities were analyzed, as were the costs incurred by the Defense Logistics Services Center (DLSC) operation. Benefits were evaluated through analysis of a sample of data from recipients as to the use being made of requisitioned material and whether or not the use of the excess item had precluded the necessity of making a procurement. The study delineated a grouping of "values" for excess material dependent on type use/type procurement avoided and associated this benefit with the cost of effecting utilization. These interdependent criteria were formulated into eight tables covering appropriate Federal Supply Groups which were intended to provide guidance as to reportability based on weight, condition, and acquisition value. Adoption of these eight tables was recommended in lieu of the reporting criteria shown in DoD 4160.21-M.

70-02. Report on Simulation Requirements in the Defense Supply Agency (DSA) (March 1970)

Prepared by the Simulation Task Force.

This report delineates areas where simulation may be profitably employed for DSA operations and planning. It defines personnel and other resources available and/or required to support the simulation effort, and identifies alternative organizations for its accomplishment. It also devises a method of evaluating the relative merits of a SIMSCRIPT and a FORTRAN simulation model.

70-01. Item Stockage for a Loose Issue Warehouse (March 1970)

This report outlines a procedure for stocking a loose issue operation so that replenishment costs are minimized. The basic principle is that of giving preference, within the limits of available space, to those items for which a small amount of space will contain a long-lasting supply; thus reducing the

number of bin replenishments required for a given number of issue documents. This, of course, provides for the largest possible size of a bin replenishment, thus making best utilization of materials handling equipment. A unique aspect of this study was the introduction of cube/time periods as a stockage criterion. The minimization of the replenishment function was accomplished by the method of Lagrangian Multipliers.

69-09. Economic Analysis of Proposed DESC Administrative/Warehouse Space Conversion (1969)

This report reflects the results of a cost/benefit analysis undertaken to explore alternative solutions to administrative space alignment problems existing in 1969 at the Defense Electronics Supply Center (DESC), Dayton, Ohio. The study report enumerates six alternatives, three of which consist in only partial (lower cost) approaches to problem solution and have limited economic benefits.

69-08. Cost Comparison Analysis on Automated Budgets Processing Equipment (1969)

This study was a cost comparison of input/output teletype terminals compatible with time-sharing computer facilities. The two input/output terminals under consideration were Models 33 and 37. Historical data about Model 33 being used by the DSA Budget Division was studied to determine the terminal's cost and that office's use of the terminal. Its cost operation was compared to the calculated cost of the Model 37 with an identical workload. Only recurring costs of each system were examined. A break-even analysis was performed to calculate the point at which the Model 37 becomes less expensive to operate than the Model 33.

69-07. Summary of Benefits of the Low Demand Item Logic Filter on DCSC Items (1969)

This report summarizes the benefits achieved with a low demand item logic filter on items stocked at the Defense Construction Supply Center (DCSC). A sample of DCSC items was selected for the DSA Computer Simulation Program. This simulation represents the inventory process at DCSC. The filter utilizes data from this simulation. The low demand item filter was proposed in an attempt to identify those low demand items that have a high probability of being deleted from the total system of inventory management. The results suggest that those items screened by the filter have a high potential for deletion and represent a significant reduction in the inventory management process.

69-06. Economic Analysis of Alternate Sites for the DLSC (November 1969)

This study explored the possible utilization by the Defense Logistics Services Center (DLSC) of the Air Force Station (Sage) Site at Fort Custer, Michigan. Four alternatives were considered. The factors evaluated included: space requirements, availability, utilization and expansion; O&M and MILCON costs; impact of a relocation on operations and personnel; and the requirement for site hardness, standby power and uninterruptible power.

69-05. The Use of Discounting Analysis in Evaluating Federal Government Investment Projects (September 1969)

Thesis submitted to George Washington University.

This paper examines the question of whether discounting analysis should be used in evaluating Federal Government investments. The arguments for and against discounting are examined and a conclusion is drawn. The rationale for using discounting and the method of its application and its effects are examined from the viewpoint of economic theory. The general nature of Government investments is analyzed to determine if they are susceptible to the same kind of economic analysis as investments in the private sector. Some examples of the use of discounting are analyzed to illustrate its applicability and some potential areas of application are reviewed. The arguments against discounting are examined to determine the limitations on its application to Government investments. Finally, the various theories on how the appropriate rate for use in evaluating Government investments should be determined are reviewed.

69-04. Economic Analysis of Proposed Modernization of the DPSC Manufacturing Facility (August 1969)

This study explored the feasibility of a proposal to air condition and modernize the Defense Personnel Support Center's manufacturing facility. Cost/benefit estimating relationships were developed for each activity substantially affected by adverse heat/humidity conditions, as well as those other areas of proposed modernization not associated with air conditioning. Additionally, estimating relationships were developed for operational costs associated with the proposed improvements so that total cost could be compared with total life-cycle benefits accruing to the Government.

69-03. Inventory Simulation of the Defense Construction Supply Center (June 1969)

See abstract 70-11.

69-02. Inventory Simulation of the Defense Personnel Support Center - Medical (April 1969)

See abstract 70-11.

69-01. General Guidance for Selection of Weighting Constants of DSA Exponential Smoothing Forecasts (March 1969)

This paper contains nonmathematical guidance for forecasting inventory demands of the Defense Supply Agency (DSA) by double exponential smoothing. All statements are made without mathematical proofs being shown. Text references are given for those who desire to know the proofs.

68-05. Development and Application of Defense Supply Agency (DSA) War and Emergency Planning Factors (December 1968)

This study consisted of a series of experiments in the development of long-range predicting equations for selected DSA workload and volume indicators which are sensitive to customer force levels. The only exogenous variable

studied and reported on was a military strength. Endogenous variables studied were Defense Stock Fund sales, dollar value of materiel inspected and released for shipment from vendors, and key DSA materiel management system workload indicators. The primary study technique used was regression analysis. Some of this work was published in "DSA Stock Fund Sales Relationships to DoD Troop Strength." April 1968.

68-04. Economic Analysis of Alternative Modes of Shipping Small Issue Items - Consolidated Freight vs. Parcel Post (November 1968)

This study determined the most economical policy for selection of shipping mode for parcel post eligible small issue items. That is, whether to mail such items individually, or whether to hold such items for consolidation into freight shipments, or some intermediate policy combining the two modes. The cost and timeliness of the mixed mode policy under the Mechanization of Warehousing and Shipment Processing (MOWASP) system were compared with the cost and timeliness of two single mode policies, one maximizing the parcel post mode, and one maximizing the freight consolidation mode.

68-03. Generalized Linear Programming for Bulk Supply Planning (September 1968) (FOUO, Proprietary)

Prepared by R. Shriver Associates, Denville, New Jersey.

This report provides a generalized linear programming approach to problems of (1) supply vessel movements, including loading and discharge volumes, (2) terminal product tankage, and (3) supply vessel fleet composition. The underlying model minimizes total supply cost, satisfying all terminal demands and supply availability restrictions. Complex interactions among different port terminals are discussed. (Note: This paper not to be released outside the U.S. Government.)

68-02. Implication of Terminal Value Policy in Economic Analysis of Proposed ADPE Investments (September 1968)

This study evaluated the implications to DSA automated data processing equipment procurement budgeting which would result if the following revisions to DoDI 7041.3, 19 December 1966, were made: elimination of thresholds for mandatory application; elimination of the few existing options for using a discount rate less than 10 percent; and, the reversal of present policy of considering terminal or residual value of the proposed investment at the end of its economic life.

68-01. Report of Simulation of Various Demand Forecasting Techniques (June 1968)

The Standard Automated Materiel Management System (SAMMS) prescribes the use of double exponential smoothing as the technique for forecasting future demands. This study compared the prescribed technique with three other prevalent methods: single exponential smoothing, moving average, and a 4, 3, 2, 1 weighted average. The four techniques were built into a simulation program of the Defense Electronics Supply Center (DESC), and compared over a sample of 328 active DESC items. A copy of the program is included in the report. Four

measures of accuracy were used for each forecasting technique over three demand patterns: a constant model, a theoretical ramp, and a modified ramp with noise. The results indicated an advantage for double exponential smoothing.

67-01. Inventory Simulation of the Defense Electronics Supply Center
(April 1967)

See abstract 70-11.

66-01. Nonperishable Subsistence Study Report (1966)

This simulation analysis compared the Defense Supply Agency (DSA) Standard Automated Materiel Management System (SAMMS) procedures with an existent decentralized system used by the Defense Personnel Support Center for subsistence items. The decentralized system had been considered less costly for nonperishable subsistence due to the relatively high transportation costs with respect to the value of the material shipped. The study concluded that SAMMS procedures provide a slightly lower overall cost, by about seven percent of variable operating costs (transportation, inventory holding, and procurement costs). The decentralized system trades lower transportation costs for higher inventory while the centralized system trades higher transportation costs for lower inventory, providing approximately equal protection. The study report includes a thorough explanation of the logic of the detailed simulation of the SAMMS procedures. This was the first such simulation of a typical DSA Supply Center.

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